Extracts from the Topography and Vital Statistics of Calcutta

1837




EXTRACTS FROM THE

# TOPOGRAPHY AND VITAL STATISTICS

OF

# CALCUTTA,

EMBRACING OBSERVATIONS ON THESE SUBJECTS FORMED AT DIFFERENT PERIODS, AND OFFICIALLY SUBMITTED TO THE LOCAL AUTHORITIES,

BY

## F. P. STRONG,

SURGEON, 24-PERGUNNAHS.

TO THOS. SMITH, Esq.

*Third Member of the Medical Board and Superintending Surgeon.*

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Art. VII.—*Correspondence connected with the Topography of Calcutta and its vicinity. Communicated by* F. P. Strong, Esq. *Civil Surgeon, Calcutta Sudder, &c.*

*August 29th*, 1837.

Sir,—In answer to your circular of July 29th, forwarding for my perusal, a letter from the Secretary to the Medical Board to your address, expressing the desire of the Board to afford every practicable assistance to such gentlemen as may be engaged in drawing up topographical accounts of stations in your division; I have the honor to forward copies of several papers, written some years ago, upon this city, its suburbs, the salt marshes, and the Sunderbuns, south-east to the sea; and to which I have added notes in the margin in further elucidation. I also have annexed other papers more lately written, bearing upon the same subject, and a letter* to Lord William Bentinck written by a committee which was formed of gentlemen in the suburbs in consequence of my first communication upon the subject in 1828. A small map shewing the bearing of the different parts alluded to is appended, in which Mr. Tassin has, at my request, painted the Salt Lake of a bluish color, and the low thick salt-water jungal, between the further end of the lake and Tarda, green; while he has represented the lands granted to various persons towards the end of the year 1829 and in 1830, in yellowish green color; to shew their position, the line drawn with carmine points out the new eastern canal, the purple shews the old route by Tolly's Nullah, and the orange shews the route by channel

* Is not here annexed.

creek. This is a map made only last year, and is not the map I allude to in my papers for further information. There is a large one of the lake and Calcutta by the late Captain Prinsep, giving the levels also; and there are other larger maps by Tassin, of Calcutta and the Sunderbuns, shewing all the individual grantee's grounds, numbered, and pointing out the new eastern navigation, projected, and partly carried into execution, by the late Major Schalch, in a more particular manner than this small map will admit of. One of the letters annexed will shew that I was called upon by the late Governor General Lord William Bentinck to attend a committee at the Government House upon the subject of draining Calcutta, and the drainage and filling up of the Salt-water Lake. The committee was composed of fourteen gentlemen, and His Lordship alluded to his own experience in such matters having induced him to call this meeting in order that it might be continued by his successor, and mentioned his communications with the Court of Directors, and their assent to his views in the affair of draining the lake. The committee was to meet again, but His Lordship's illness prevented it, and the subject appears to have slept ever since, except that the public prints have occasionally thrown out the views of different writers interested both for, and against. His Lordship had his own plan for draining the lake printed, together with that of the late Captain Prinsep, and his questions to that gentleman and the answers thereto. There were also some other papers annexed to these, bearing upon the subject, all of which I gave to Sir John Grant, who has given them to Lord Auckland. They are interesting as connected with the subject of my papers, and should I be able to obtain a copy from the Military Board, or elsewhere, I will send them to you. I would add, that when I first waited upon the Governor General, no part of the eastern circular canal had been commenced upon, not a hoe had been applied to the ground, nor had a tree been felled; and I then understood, that although the whole ground had been purchased by Government for the entire line of the new eastern canal from its entrance from the Bághbazár floodgates, to the old Entally canal which runs into the lake, yet, that some obstruction, or difficulty, presented itself to this improvement being effected. Viewing this as the nucleus of all improvement with a view to effect a healthiness in this city, I took with me a map of Calcutta, with the projected canal drawn out in pencil, the more clearly to point out what I conceived of the utmost importance, and I was gratified to find that His Lordship took the same view of it that I did, and acted upon it, though I was given to understand that he met with considerable opposition; it is now however finished, and has been so for some time, there is considerable traffic upon it, and the monthly tolls form a considerable item of profit,* although the failure of the mercantile houses

* By a Statement in Appendix I. page 145, by Mr J. P, Morris, late Clerk to the Municipal Committee, it appears that there is a Surplus Balance up to 30th April, 1845, of 15,14,782 Rupees, in favor of the Calcutta Canals exclusive of Interest, while the receipts of the two following years were

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|---|---|---|---|
| 1845-46 | 1,93,759 | 1 | 1 |
| 1846-47 | 1,95,574 | 5 | 1 |

The Ballighatta Canal previous to the excavation of the Circular Canal only yielded 17,797 Rs. per annum, it yielded in the year 1845, 1,38,745.—F. P. S. 1848.

has materially deteriorated the value of the ground Government have to dispose of on each side of this canal. It has six suspension bridges over it, and a pucka road on its western bank.

The first paper marked 1828, may be considered entirely topographical, and was written about the time that I addressed the Sudder Nizamut Audawlut upon the general unhealthiness of the suburbs of Calcutta. I informed the Governor General that I had made such a report in my official correspondence with that Court, and I found afterwards that my remarks were recommended to the attention of the Governor General in Council. This led to a communication with the Magistrate of the suburbs, and 24-Pergunnahs, then one district, bringing my report to his notice, and desiring his attention upon the subject; he immediately put himself in communication with the Entally committee, and some time afterwards Mr John Master, the Magistrate, shewed me a plan of his own for the improvement of the suburbs, and the sites were marked upon his map of the 24-Pergunnas, where he proposed to have large tanks excavated and roads made. Besides this, the Entally committee had several interviews with Lord William Bentinck, and gave into His Lordship's hands, their plans of improvement, of which the letter I have alluded to, forms only a part; they also gave in maps of the jangals, roads, and grounds generally, and the then price of the land, &c.; sites for tanks were I know fixed upon and marked; but His Lordship went up the country, and nothing has been done.

The second paper was written some months afterwards, and may be considered as departing in a small degree from strict topography, since I have intermixed the subject of soils, and of boring for water, agriculture, &c.; but as regards the proper formation of tanks, the draining off of water, and wells, perhaps these subjects may be considered admissible as regarding public health. The new canal had been begun, and was rapidly going on, and that work threw some light upon the general nature of the soil, and confirmed the opinion given by Sir Hyde East, that the dampness of the climate was not to be attributed to the moist nature of the soil, which was thought by some to be full of springs; and it also confirmed his opinion of an ancient forest having in former times existed much below the present surface of the earth, numerous and large trees were every where met with, many of them in an erect position.* Such was also found to be the case in the new canal made by Major Schalch, running eastward from the other end of the lake at Bamanghotta to Hussingabad, some of the wood had arrived almost at the state they call lignite. Most other parts of this paper are essentially topographical, and point particularly to facts, and

* The Superintendent, a very intelligent native, informs me that in the canal beyond the lake the trees were many of them very large, and were found in the greatest number about 30 miles beyond the lake near Hussingabad; many were very rotten, the rest were used for burning. Among them he recognized the soondry, the byen, the gouah, and other forest trees; their trunks were of all sizes, and he supposes that along a line of 30 miles they were in number from 5 to 15 in a mile. As to the depth of such trees those I saw in the nearer circular canal had their roots about or somewhat below the bottom of the canal, and I saw a large tree about the same depth in a tank digging on the borders of the lake . the workmen said this was a jack tree.

to unhealthy localities, and although towards the end of the paper I have advocated particularly the growth of cotton in the Sunderbuns, as well as coffee and sugar, I do not like to separate or divide the paper, for I advise the measure as a main means of reducing the jangal and forest, and consequently of reducing malaria. And if my third paper should be thought to give a long detail regarding boring, it yet shews the exertions that were necessary on my part to keep the experiment going; and we have now attained a depth of upwards of 400 feet, well tubed with cast iron, and the operation is going on with spirit. My further remarks advocating the cutting down the Sunderbun jangals, will, I hope, though a little lengthy, be pardoned as tending to produce a more healthy state than at present exists. I fancy myself further borne out in not selecting parts only of these papers, or altering their original diction, from the "sketch" of a plan for memoirs on medical topography sent round with the circular by the Medical Board to guide us in some degree. I there see seas, rivers, lakes, wells, morasses, bogs, and canals noted as points on which the topographer should bestow considerable attention, as they so materially affect the dryness or moisture of a country. The deposits, animal, vegetable, and mineral are also mentioned, among several other matters which I had touched upon I find evaporation of surface, and vegetable products mentioned, and an allusion to the comparative healthiness of the villages in the Netherlands, as ascertainable by the inspection, of their wells; and the state of agriculture, and population, being also mentioned, makes me hope that I shall not be blamed for not leaving out what I have said of Baron Humboldt, and also of the campine of Brabant in the Netherlands, and the Abbé Man's remarks upon the same; and I need not apologize for what I have stated from Macculloch's work on the prevalence of epizotic diseases appearing among cattle, at the noted seasons of epidemic fever among men, because I find in the "sketch" circulated by the Board, that that is a subject that should be inquired into by the topographer. Indeed, I should have found a difficulty in making any alterations in my papers.

It will be seen in the accompanying papers I have alluded to Mr Martin's paper on the medical topography of Calcutta and its suburbs; but there is one part of it which I have omitted to refer to, but which, as surgeon to the suburbs and 24-Pergunnahs, I ought perhaps to notice. Mr Martin suggests that the police surgeon should report upon the state of habitations, sewers, streets, roads, tanks, &c., and that he "should also report *minutely on the state of the suburbs.*" The late Dr. Vos, the then Police surgeon, in whose opinion, as to the necessity of improvement in the suburbs I fully concur, was accordingly called upon by Mr Martin for his sentiments. Mr Martin was not I believe aware that my duties as surgeon to the suburbs, had not only brought to my attention the importance of the subject, but had induced me, at an earlier period than the date of his papers, to make the repeated reports detailed in the accompanying papers. I merely allude to this, as any person reading only Mr Martin's papers, might be led to infer, from the suggestion to extend the duties of the Police surgeon to the suburbs, that the surgeon of the suburbs had omitted all notice of the obvious

causes affecting the health of that portion of the district under his charge, whilst in reality, it has not been for want of representation of their bad effects, that the various causes of unhealthiness in the suburbs have been allowed to exist in their full vigor until, as I am glad to observe, they have at last attracted the notice of other medical officers besides myself. Finding that the printed papers advocating the fever-hospital, &c. were in circulation, I forwarded to the Government the three first of the accompanying papers, and that upon the effect of the inundations, and I received from Mr Mangles an answer, that my opinions would not be overlooked when the matters to which they relate come under the consideration of Government. I annex a copy of the correspondence for your information.

The fourth paper which I admit to be rather rambling and irregular in its character, was written, as far as I can recollect in 1830, at the request of the late Captain Herbert, and is in continuation of some papers I had already given him upon the same subject, but which had relation more particularly to the city and native town of Calcutta, also including the lake and Sunderbuns; but Captain Herbert required further information respecting the suburbs, as the unhealthy state of them he thought was the more immediate cause of sickness there. He said he considered that in these parts, there was not sufficient space to breathe, without inhaling disease, and that the luxurious growth of vegetation every where existing among the huts and villages, produced the malarious atmosphere, which not only influenced the suburbs but extended its effects to the city. He intended to have published his opinions in his Gleanings in Science, as remarks on the Malarial Topography of Calcutta and its neighbourhood. Indeed he had begun this paper, and had considerably advanced in it, when his departure from the Presidency caused him to transfer the work to other hands, and he then gave up his paper upon malaria.

This paper or memorandum is copied from a rough paper intended simply as a skeleton for Capt. Herbert to build upon; loosely written as it is, it may not be irrelevant to the subject of topography, as it contains some allusion to facts, which may not be altogether useless.

All the above papers were written seven or eight years ago: but the next paper, or letter,* which, although long, is a question altogether about climate, was for the information of the commissioner of the districts contiguous to Calcutta; and in answer to an inquiry issued on the part of Government, endeavouring if possible to select the more healthy from the unhealthy districts, with a view to send prisoners who are banished, to those districts that are found to be the most healthy. It will be seen in this letter, that I enter upon the subject with as much care and attention as I can command; this subject was a difficult one, and it was an answer to a circular which was addressed to all the other civil surgeons as well as to the magistrates; and the commissioner informs me that my letter was the only one of all those he received that he had forwarded to the superior Court, the Sudder Nizamut Adawut, and he said he did so, because he thought it contain-

* This is now placed after Colonel Sykes's Analysis of my Vital Statistics.

ed a good deal of useful information ; such being the case, I hope, I shall be pardoned for forwarding it to you on this occasion.

Perhaps the health of prisoners in a district may not be altogether a very bad criterion of the healthiness, or otherwise of a district. The question had reference to banished prisoners and those in the Allipore jail being all banished prisoners and for life also, induced me to make a comparison of the mortality among them for a series of years. I found the average mortality little more than 5 per cent. which considering that every man must die there, in the proportion did not appear great. In cities and other places, and departments as in the army with a regiment, or in other services, they retire, become pensioned or otherwise quitting, leave the field for others, and do not remain to swell the mortality; but in this jail where men—many of them coming in, advanced in age—are located for life, a larger mortality ought to be expected than among other bodies. I therefore come to the conclusion that it is healthily situated, and it will not appear inconsistent with my opinion expressed in the former letter, as to the general causes of unhealthiness, because those causes are obviated in this particular case. The jail is an *open space* clear of jangal, and these prisoners are free to breathe good pure air in the absence of all jangal, filth, bad water and other nuisances of which I complain as affecting the suburbs generally. The air is clear, and the jail tank probably the best of any, either in or near Calcutta, and I think it is an instance which goes to prove the correctness of the opinion of those who see sickness and death produced by malaria where it is allowed to exist; as for instance, in the character of the diseases and death which I allude to in the margin of my second paper, in the case of Prince Sooroodeen who allowed jangal to grow up to his very doors at Russapaglah, and whose continuance of life for several years was a source of surprise to myself. It may be that the quantity of opium he took may for a time have counteracted the poison of malaria which killed his only two sons when infants, and spread disease among his domestics. The Mr Ward I allude to in the margin of the memorandum for Captain Herbert, is another strong instance I would add in proof, and in addition to the facts and localities I point out in my ealier papers, I am sorry now to add another case to swell the list of mortality arising from the same cause. In all other respects, a most intelligent native doctor who had been in my service for nearly twenty years, could not be made to understand that his continuance in his family house at Bhawanipore surrounded by malaria would be the death of him. I often so assured him, and took the greatest pains for a year or two, but all without effect ; an old jangal piggery inhabited by chumars and pigs was the place of his residence, and his diseases were first intermittent and remittent fever, dysentery, spleen, and he died dropsical.

The Allipore jail I consider to be situated in the healthiest part of the suburbs, and the whole of Allipore being perhaps somewhat higher and better drained, or from the nature of its soil, which is sandy, does appear to me to have advantages over all the other suburbs, if perhaps the open and airy part of Balleegunge be excepted. If I am rightly informed, the inundation of 1833 which produced sickness in every house

in Garden Reach, had not any serious effects either in the open parts of Balleeguuge, or Allipore, while all the inhabitants of the rest of the suburbs were considerable sufferers, and great mortality was produced among the native population of those parts.

The consequence of this flooding was felt even in the city, for by the Police reports the mortality in 1833 nearly doubled that of the preceding year, no doubt increased by the vast number of the 24 Pergannah sufferers, both rich and poor flocking into the city, turned out of their habitations by the floods, arriving also for medical aid, as I have remarked in my paper upon the subject written just after the inundation. The soil of Balleegunge I have found by the borings I have made there to be very sandy, (indeed the place takes its name from bálú or sand, which is highly calculated to carry off or absorb superfluous water ; and I would here remark that the lands to the south-east as far as Gurriah-haut, and very far beyond that place are an open plain, occasionally with the exception of garden cultivation, cultivated with rice or tobacco to the extent of many miles, say twenty ; and it is only here and there that villages are to be seen, and these at a great distance from each other. It appears to me, and I wish to press it upon the minds of those who consider this subject, that the malaria Calcutta has to complain of is very greatly, although not entirely in the surrounding crowded villiages, and more particularly those to the eastward between the Salt Lake, and the Mahratta Ditch, for admitting what now seems to be uncontradicted, that this lake is highly productive of malaria—the air, when the wind is eastward of us has to find its way to our city, only over swamps, jangals and villages themselves highly productive of the same malaria, and therefore not calculated to dispel the evil. The advantage enjoyed by Calcutta when the wind is south, is that it passes over a large tract of country with very few villages ; besides which there is the fine maidán south of the city to neutralize what malaria it possibly may contain ; a similar remark may be said to apply in some degree when the wind is in the north,—and on the west the river is some safeguard, but the eastern is notoriously the bad wind, and I think here it is sufficiently accounted for.

Should the researches now making tend to a better knowledge of these facts, some attempts at improvement may commence. Very slow and gradual improvements have no doubt, been adopted by the few Europeans and others of intelligence, who have at different periods inhabited our eastern suburbs, so much so, that among Europeans life is much more safe than it was half a century ago, when we know from well authenticated records that the mortality was frightfully great, and we find the Salt-water Lake recorded as the most prominent of the causes. Should cleanliness ever obtain in these eastern suburbs and the Salt Lake become drained and cultivated, I entertain no doubt whatever of great healthiness being the result ; and one great advantage attending the drainage of the lake would be, that the country between it and the city would immediately improve, become more valuable, and be the resort of a more respectable population.

However malaria may be generated, there can be no doubt that it is produced most abundantly in all those parts of Bengal which are not cleared of jangal, drained, and kept clean. Within my recollection the maidân south of our city was more swampy, and covered with a coarser grass than it now is, and many parts of the native town, and Chowringhee, are much improved, broad roads and squares having been made, and it is quite obvious to me that fevers and diseases in general are by no means so common as when I commenced practice here; I am so certain on this point, that I will not waste time by entering into particulars. Further drainage and more free circulation of air will still farther improve the public health, and it is admitted on all hands that attention and improvement in our city drains is indispensible to effect the good desired.

Yet, I think we must look to the improvement of the surrounding suburbs, and lands beyond, effectually to render this city as healthy as it can be made; and without attempting to investigate the chemical analysis of malaria, or to describe what medical treatment should be adapted for diseases produced by this poison, I will endeavour to draw attention and point the numerous causes existing all around us.

Let us look around us, and we find all the essentials necessary for the formation of malaria; beyond our city jangals, lakes, marshes, gardens crowded with trees, and woods of every description, and weeds, stagnant water, filthy pools, and low grass jangals of every kind surrounding the villagers' habitations. In these exist ample means for a constant supply of the poison, assisted, as they are, by the natural heat and moisture of the climate; but when unnatural or meteoric changes of climate take place, or when unnatural inundations of sea, or river water occur, then, as we should expect, we find disease and death scourge the land, as was instanced by the inundation of 1833 in particular, and as shewn by all the other* inundations also. Such excess of mortality is to be expected in Bengal when inundations, or unusual moisture followed by great heat occur. As common cause of the constant malaria that prevails here I would mention the exposure of a vast expanse of wet mud on the receding of the tide from the Salt-water Lake, and banks of the rivers, and tide harbours—it would not be difficult to enumerate more causes, but the above are sufficient. Within the city among numerous other causes we find sewers and drains sadly neglected, allowing their decomposed and decomposing animal, vegetable, and other substances to sink into the earth, instead of draining off as they should do into the river or the circular canal. Here perhaps in some particular state of the ground, the soil may be of a nature calculated to receive the poison, and it probably condenses and accumulates, forming as it were, a permanent attachment to the spot, and for what we know, certain peculiar solid bodies casually exposed to it may receive it also, whether the poison be produced by common putrefaction, or by any peculiar change in the elements of vegetable matter, dead or dying. It seems to be admitted that we know not its exact chemical character, though it is acknowledged that it is pro-

* Those of 1831, 1832, and 1834.

duced and propagated by wet soils, hot countries, a particular state of atmosphere and high temperature, and with this knowledge we do possess power to control and check to a very condsiderable degree this extensive cause of mortality. We know by authentic records that it is but little more than a century ago when London, from its then filthy state and bad drainage, was subject to very great mortality, and as civilization has advanced, the countries as well as the cities in Europe have also improved in healthiness.

Dr. Bisset Hawkins describes in his work lately written on medical statistics, that mortality has diminished in nearly the same degree, in which the prosperity of these countries has gradually increased. In England and Wales for instance, the annual deaths were, in the census of 1780, so numerous as 1 in 40. In 1801 they were 1 in 47. So in France (a more malarial country it might have been remarked) the annual mortality was in the year 1781, 1 in 29, and in 1802, 1 in 30. In London he considers that now, 1 person in 40 dies annually, while he gives the mortality of England and Wales at the present time 1 in 60, a considerable improvement since the year 1780, when it was 1 in 40. Doctor Hawkins gives the mortality of various continental cities, and compares them with the country mortality, which it exceeds in every instance. He remarks that mortality or the calculation of the number of deaths which occur in a country, or town, has become an important object of research, and that tables are formed in almost every civilized state by direction of the Government in order to ascertain the point.

In some districts this amount is increased, or diminished in a slight degree, by direct, and by local causes; but on the whole, it appears that the good or bad condition of a people, the possession of the necessaries of life, or their absence, mildness or rigor of the mode of Government, the advance or retrogression of knowledge, are the principal circumstances which influence the result. The greatest difference of mortality in city and country, appears in Holland, where in Amsterdam the deaths were 1 in 24, while in the country it was 1 in 48. In the city of Naples 1 in 28, in the country 1 in 35. In the city of Paris 1 in 32, in France 1 in 40. I may be allowed to quote Dr. Hawkins' concluding reasoning upon this important subject, "Life and death, then, mainly depend upon the prosperity of the circumstances which surround us: physical prosperity and moral happiness, which often depend, and re-act upon each other. present a safeguard at every crisis of existence both to individuals and to nations. We may often judge with tolerable accuracy of the mortality which is likely to exist in any given country, town, or hospital, from the degree in which poverty or wealth, knowledge or ignorance, misfortune or success, are seen to prevail; wherever want and misery exist, there the mother is more likely to die in labor, there still-births will be more frequent, there the deaths during infancy will be more numerous, there epidemics will rage more violently, there the recoveries from disease will be more tedious, and the fatal termination of it more probable, and there also will death usually approach at an earlier period of life than in happier situations. It will be seen in the statistical account of the British empire just published by J. R. Mac-

culloch, Esq., under the head of vital statistics, that between the years 1813 and 1830 he calculates the annual mortality in London at 2.84 per cent. and for six towns in England for the same number of years as at 2.95, and he estimates the mortality at Glasgow between the years 1821 and 1835 at 2.83 per cent., whilst he gives a detail of Wales and forty counties, shewing in every instance a considerable decrease of mortality as compared with London, Glasgow, and the six towns above cited. The above mentioned book has numerous tables upon points of mortality, and contains other information upon the same subject of great interest.

With regard to this part of India, I mean to confine myself to Bengal, I think the reverse of what occurs in Europe as to mortality will be shewn, when we obtain statistical reports that can be relied upon, and whatever may be the healthiness or otherwise, of the other Bengal cities, I expect such will be found in Calcutta, though it cannot be expected that we should shew so small a mortality as exists in the city of London or the other European cities.

In England and Wales the poor are taken care of in workhouses, and the sick poor receive good medical and surgical advice and attendance in hospitals, but in India where the knowledge of medicine and the healing art is the same as it was many centuries ago ; where in place of a sympathetic feeling for his fellow-man there not only prevails an apathy in the Indian character, but where a division of caste prevents the agency of good will and assistance of one towards another ; where insufficient clothing, bad food, bathing at improper times, and the practice of fasting for long periods, (adopted both by Musalmáns and Hindus,) and where the Hindu ceremony of Antarjalí, which is so general—taking the sick to expedite their death upon the muddy bank of the Ganges—prevails ; added to all this, the want of advance in civilization and knowledge, and taking into view the extensive sources of malaria so much dwelt upon, the existence of which I conceive must in a great measure proceed from the want of knowledge and advancement in intelligence above alluded to, we must naturally expect to find a greater mortality here than in Europe.

The housing and habits of the Bengális which I have attempted to describe in the 9th paragraph of my letter to the Medical Board, dated March 21st, 1835, all seem to have a tendency to deteriorate and shorten life. The diseases of Bengal are nearly all produced by malaria, and bear a very strong analogy in character to the diseases formerly prevailing in European cities and countries, in times more uncivilized than the present. Sydenham speaking of those times, says, "Cholera comes almost as constant at the close of summer, and towards the beginning of spring, as cuckoos towards midsummer." He closes an accurate description by remarking, that it "often destroyed the patient in 24 hours." Dr. Craigie has demonstrated the *antiquity* and *identity* of cholera all over the world. The description and remedy for cholera taken from the work of Hermannus Vander Heyden, a physician of Ghent, dated 1653, published in the 1st vol. of the Gleanings of Science, I myself sent to the author in 1829. The remedy as far as the opium and he[illegible]hyoscyamus or the Khorásání ajwáyan is concerned

I can speak of myself most favorably from extensive experience. The author remarks that the taking of it (the remedy) is not to be deferred so long, as that the patient shall have fallen into convulsive fits, and his excrements become of the color of whey, which are evident signs that nature is spent in him, for then it must be taken with all speed, &c. Fevers remittent, intermittent and anomalous, with cholera, diarahœ and dysentery, spleen, and all the nervous disorders under the head of neuralgia, are the prevailing diseases both among the rich as well as the poor natives of this country. We find the Bábus of both Calcutta and the Mufassal passing through a life of disease and misery, and dying early in life, somewhat similar to our European barons of old, who are said seldom to have attained to an advanced age, the filthy moats surrounding their castles being supposed to have been the main cause; so here as I have often had occasion to remark in and about houses of opulent natives, there are causes sufficient for all the mischief alluded to.

In conclusion, I will add some tables of the census of Calcutta lately taken, with the mortality of the natives for the last five years taken from the Police books. Captain Birch began this year to procure the births, so that in future a more correct estimate may be formed. The great difference in mortality between the Hindus and Musalmáns is striking, while the difference to be observed between the Portuguese as compared with the English and the Eurasians is equally so.

Here is much room for speculation, and it cannot be said that as yet we have as good means of getting correct information upon this subject as they possess in Europe; nevertheless, we may approach as near as we can to the point we wish to ascertain, and we may hope to improve in such statistical records. If we are at all near the truth the result seems to agree with the opinions formed by Dr. Hawkins in his conclusions and summing up upon the subject, just above referred to, and quoted. The Portuguese, among whom so great a mortality is shewn, are a suffering race, greatly subject to the catalogue of complaints enumerated in these papers, while the English and Eurasians are far more prosperous in life, and enjoy comforts and happiness in a very high degree, as compared with the former section of society. The mortality of the former 3½ per cent. per annum, while that of the latter being 12½ per cent. is very great. In 1830 I ascertained, and published in the Gleanings of Science, the burials in Calcutta of Protestant Christians from the year 1820, to shew at that time that although the European population must have greatly increased yet that the deaths and burials had not increased; and now, that the same population is acknowledged to have increased very materially indeed, yet we see upon referring to the first column of one of the tables, giving the Protestant burials for the last 20 years, no increase of deaths. The years 1833-4, the two years following the sea inundations shew the greatest mortality of late years; while among the native population those two years shew an extraordinary mortality. The two last years shew that in both European and Native population healthiness is restored. The mortality among the other columns of society, the Catholic, Greek, Armenians, Indo-Armenians, and Native Christians, are for the last 20 years, and

I believe them to be nearly correct. As the Chinese and the Jews keep no account of their burials, I of course could not include them, and they form a small portion of society in this city. The census is the one last taken by Captain Birch, and he took great pains to make it as correct as possible. You will observe by one of the letters annexed that upon the receipt of your circular I addressed the magistrate of the 24-Pergunnahs requesting a census of the zillah, together with the mortality, and you will see his obliging answer to the same: the census I send is only of the suburbs division, which forms only a part of the district.

I have, &c.

(Signed) F. P. STRONG,

*August 29, 1837.* *Surgeon to 24-Pergunnahs.*

"I find that my letter is defective inasmuch as I have not noticed what has been done at different times in the suburbs of Calcutta when cholera has been scourging these parts and carrying off all its victims who could not obtain, or who declined medical aid."

It is but justice to the native doctors who are permanently appointed to the different gangs of prisoners on the suburban roads, as well as the native doctors attached to the Mysore princes, that I should state how eminently successful they have been in saving life under these dreadful circumstances, and this has been a work they have at such times performed, independent of their actual duties. I think I may say that taking the average of several years, the mortality among villagers has not been more than 6 per cent. of those attacked with cholera, where the above mentioned doctors, and others appointed temporarily to assist on urgent occasions, were called to the patient in the early stage of the disease, and the average of the last sixteen years gives a proportion of 6¾ per cent. among the prisoners attacked with cholera at this sudder station." A like favorable result attended the native doctors appointed at Bombay, when the cholera became epidemic in that place, and Dr. Ogilvy, the then Secretary to the Medical Board of that presidency, remarks that it was not ascertained that any case of cholera had recovered in which medicine had not been administered. 1204 fatal cases of cholera were reported by the Bombay Police, in none of which cases had medicine been given. Should this be the case in all situations among the poorer natives of India when cholera prevails, might it not be considered as a highly to be desired act of benevolence on the part of Government, that native doctors, should be permanently fixed at different points? Say one, or two, with a supply of medicine at each thannah, immediately to render assistance in case of any illness, whether fever or otherwise, for although it is possible that every case of cholera reported as such, may possibly not be actual cholera, yet it probably may be a formidable disease and would be immediately relieved; while fever, dysentery, &c. would receive a check, and most cases of cholera would be cured at once. The subject is an important one and probably much better plans than those I have suggested may be put forward by others and adopted by the Government

I would only here remark, that such remedial measures may be the means of preventing much serious disease, and to a certain extent, preclude the necessity of native hospitals. The natives themselves seem to have a great objection to quitting their homes, and mixing with different classes of their fellow-men.

It appears to me that as a means of checking the progress of disease among the natives of this country, some such plan would be found greatly to assist the grand preventive means, the subject of my theme, the removal of malaria.

In the map of the 24-Pergunnahs which I copied from the map which Mr John Masters lent me several years ago, will be seen the roads and tanks proposed by that gentleman to be made in the eastern suburbs marked in red ink, and it will be observed that this projected improvement occupies at least half the ground between the Salt-water Lake and the Mahratta Ditch. The improvements recommended by the Entally committee were more extensive.

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EXTRACTS FROM THE

# TOPOGRAPHY AND VITAL SATISTICS OF CALCUTTA,

EMBRACING OBSERVATIONS ON THESE SUBJECTS FORMED AT DIFFERENT PERIODS, AND OFFICIALLY SUBMITTED TO THE GOVERNOR GENERAL LORD WILLIAM BENTINCK AND THE LOCAL AUTHORITIES,

BY

F. P. STRONG,

SURGEON, 24-PERGUNNAHS,

*Much of the matter herein condensed will be found as it occured, to be actually in anticipation of orders subsequently received by the local authorities from the Hon'ble the Court of Directors of the East India Company.*

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TO THOS. SMITH, Esq.

*Third Member of the Medical Board and Superintending Surgeon.*

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*No.* 1, 1828.—*On the Topography of Calcutta, the Suburbs and the Lake and Sundarbans beyond.*

In and about Calcutta among the causes of unhealthiness are the number of small dirty tanks, and the large drains from which the water does not run off; examples of these may be seen in every direction, but particularly along the Circular Road, the Baitakhanah Road, and the roads in and about Entally and Sàildah. To these may be added the numerous holes or tanks of shallow water which fill in the rains, and stagnate in the dry weather. To remove these causes of malaria, it would appear necessary that the drains should be kept in a clear state, so that the water should run off at once ;—and as to the holes or small tanks they should be filled up.

On looking at the map it will be seen that there is a great deficiency of *public large tanks* all along the Circular Road,* and if tanks of a considerable size were dug there, the soil from them might be used in filling up innumerable holes and tanks, and also many ditches which are perhaps of an unnecessary depth and width. A plan something like this, Dr. Martin tells me, was adopted near the Body Guard Lines and his hospital†, with great good effect in lessening the number of sick sipàhìs in hospital. To these causes may be added the

* As regards the deficiency of public tanks, I am glad to be able to add the following as a presentment of the grand jury to the judge, signed by the foreman on behalf of himself and the other jurors only the other day.

That the native inhabitants of Calcutta are, during the hot season, most distressed for want of a proper supply of water for domestic purposes, and for the extinction of fires; and that there ought to be at least *six new tanks of water* dug on the Calcutta side of the Circular Road, and the aqueduct from the engine at the Chandpaul Ghaut ought to be carried to each of the said proposed tanks, and also to the seven public tanks now being on the line of road from Sàm Bazár to Park Street, in order that the said several tanks may be supplied with water from the river &c, *August 25th* 1837

† Mr. Martin in a printed paper on the medical topography of Calcutta and its suburbs in 1834, gives a further account of the body-guard hospital, and improvements the Government adopted at his suggestion. He says—the result during the three following years, was a reduction in the frequency and intensity of fever, as remarkable as it was satisfactory. In speaking of the different villages he says, that one description will serve for all, viz. general irregularity of ground, affording lodgments of various extent for stagnant waters, now very offensive; drainage every where defective, and good tank-water scarce. There are also belts of jangal trees and underwood, obstructing ventilation. In all these villages the replies of the natives confirmed, what indeed any one could have predicted, as to the general prevalence of remittent and intermittent fevers; he adds—it may be said with truth, that of all the places noticed, there are not six square acres of soil occupied by natives which do not contain marsh, and other concentrated sources of periodic fevers which in the courcse of time establish their inevitable sequelæ of spleen, and fatal diarrhœa—the brief history of the life and death of two-thirds of all the poor inhabitants around us.

I do most cordially agree in sentiment with Mr. Martin, that without attention to the state of the suburbs in the first instance, it is useless to attempt any great improvement within the city, and he considers that for one case of fever within the city, there are two beyond the Mahratta Ditch. I allude to Mr. Martin's observations and sentiments on these subjects, as confirming those which I had previously expressed in my own papers on the same subjects; and I may add, that the late Doctor Vos in his letter to Mr. Martin's address, says—" The suburbs require much improvement, and as long as this objects is unaccomplished, Calcutta cannot be healthy, it being surrounded with jangal on all sides except the river; the suburbs of Calcutta are full of dirty pools, and no sufficiently large tanks." And he alludes to the continual sickness in most families except those who live in upper-roomed houses.

great quantity of trees and jangal to the eastward of Calcutta, and indeed throughout the suburbs, and even in many parts of Calcutta itself; much of this exists in the private gardens and compounds of individuals, and it is, I imagine, as great a nuisance as it is in towns in England to exercise any unwholesome trade to the detriment of the health of the inhabitants; and as such nuisances can there be put down, so ought the nuisance of overgrown jangal here to be capable of being removed. Much probably arises from neglect, and would be removed without any coercion; example might induce some to remove the nuisance, but there might be others who might require a stronger stimulus than either example or their own benefit. To meet this perhaps a regulation, if necessary, might be framed by Government, which I should think would not be a matter of much difficulty as far as regards the town, and for the suburbs I should hope there would be no difficulty. In the native part of the town the stench of the drains and stagnation of the tanks is a sad grievance. In these filthy stagnant small tanks or puddles, numerous natives bathe, and in these you may see filth of every kind, and I can point to such which produce sickness and death to those who live close to them; the filling up of those holes and making large public tanks would be of essential benefit as regards cleanliness and health*. Almost throughout the native town the drains are generally of a bad kind, and as regards drains, the steam-engine† now about to be erected at the Bagh-bazar, to water the central Chitpore

With the same view, I also refer to the observations made by Babu Ramcomul Sen and Dr. Jackson to Mr. Martin's address, who remark that the particular causes of fever are:—

1st. Want of tanks in different parts of the native town to supply wholesome water for drinking.

2nd. Accumulation of filth and stagnant water.

3rd. Shallow tanks, with unwholesome water.

4th. Digging pits and holes, and leaving them open.

5th. Drains.

And it is further remarked—in the suburbs of Calcutta, the drains are badly kept, water does not find its free passage in them, and amongst crowded gardens, full of marshy places surrounded by janghal, the free circulation of air is prevented, while the decayed leaves and vegetable substances thrown into the stagnant water create malaria, and produce fever; and it is added, that few of the laborers, peasants, and poorer class of people living in the suburbs, escape its effects and even the higher class of people are attacked with it, and a large portion of them fall victims to it.

* One good-sized tank has since been made in the native town.

† A considerable sum was subscribed for this purpose, but the plan was not adopted, the interest of the money being expended in watering the Chitpore road. The money was made over to assist in the erection of the College Hospital now building.

F. P. S. Oct. 1849.

road, might be made available to fill reservoirs that might once a day, or probably twice, cleanse the drains; or it might be desirable to erect more powerful steam-engines for such purpose generally throughout the presidency. The filth of every kind found in most of the cross and small roads in the native town is a great evil added to the rest, and if the chowkidars or those empowered would oblige the babus, and those in large houses to remove away their nuisance, it would be desirable. Regulation —— of 1814, enforces this.

The tatties generally throughout the native town of Calcutta, and Chowringhee, are much complained of in all directions, and situations of extreme nuisance on this account are frequently pointed out to me. I have found in the insane hospital the advantage of sinking this nuisance into deep wells†, but improvement of this sort, and of so extensive a nature would rather belong to a scientific surveyor than to a medical man whose province it may more immediately be to point out these various sources of pestiferous atmosphere, and the same remark equally applies to the general draining of Calcutta.

It is not easy to point out what this miasma or malaria is, but the state of the soil has much to do with it; it is known to be formed in marshy or undrained spots, in wet woods, and in moist meadows; and the low and dense brushwood jangal, or thickets of reed or grass, so common in India, being the residence of moisture and decaying vegetation is analogous to marsh lands, and must produce much; but it is well known that Indian fevers are caught also in forests, such as the Turraie forests, and many others, but particularly in a most dangerous one near Hussingabad and one above Bareilly.

I conceive then, that putting out of question the *Sundarbans*, and the *Salt-water Lake*, that the thickets of trees and jangal, weeds, ponds, small stagnant tanks, and jheels, which every where abound on each side of the road, down from Chowringee, Brejeetallah, to the end of Russapaglah, on each side of the Kalighat road, on to Tolly's Bridge, on each side of Tolly's nullah, and the road on the right of this nullah as far as the Insane Hospital, where the eye can hardly find any equality of surface except on the jheels and tanks, and where the wild indigo and noxious weeds are growing in all directions—all this being situated south of the presidency, must be a constant source of disease and disorders; many of which would vanish, if this pestilence could be removed. And if I am not mistaken, I can trace illness from this very source

† The same plan has since been adopted in the jail hospital at Allipore and since adapted to very cell in our newly erected Insane Asylum

(these weeds) to certain houses in Chowringee where in occasionally uninhabited houses, in the compound, and round the tanks is to be found, jangal indeed, which must add greatly to the malaria which is blown from the Russapaglah jangals over the Chowringhee part of the presidency. I have *as yet* excepted the *Salt-water Lake* and *Sundarbans*, to confine myself to *Calcutta* and its *suburbs*; but considering the general healthiness of this presidency, they cannot be well excluded, and they have been always considered as conducing to the general unhealthiness of the place, the wind coming over such an expanse of *janghal* and *marsh* The experience of medical practitioners here confirms this opinion, for it will be generally found, that where easterly winds prevail for some days together a greater degree of sickness is common. To inform myself as well as I can regarding the lake, I have been through it as far as Tarda, and frequently visited its borders by the several roads leading up to it from the Circular Road; the further half of what appears in the map as lake, is now a continued low Sundarban jangal from Bamanghatta to Tarda, intersected by channels; and the same kind of thick low jangal is continued round from Tarda to near the lands adjoined Gurria-haut on Tolly's nullah. From inquiries I have made I understand that the water in what is called the lake, but which may more properly be considered as a mere shallow marsh, is generally not much more than knee deep, and it is in many places of even less than that depth. The appearance of grass and bushes growing in the water shows that it cannot be of any considerable depth, and I am inclined to believe, that the depth of the water generally throughout the lake, is, with the exception of the navigable channel through it, not of greater depth than what I have just mentioned. The water is brackish, but becomes more salt as you proceed from Balighat towards Bamanghatta along the navigable channel which runs through the lake to that place. No one can doubt that a shallow* brackish or salt marsh, extending as the one in question does, over a surface of many miles†, must be a source of much unhealthiness, particularly in a tropical climate and that it must produce a contaminated atmosphere, the bad qualities of which must affect the health, not only of those inhabiting its immediate borders, but also those residing in the neighbourhood for miles arround it.

* Marshes into which sea-water occasionally enters, are observed to be more pestilential than mere fresh-water swamps. Vide Dr. Traill's Medical Jurisprudence, page 88, and other authorities.

† Eighteen and a half square miles.

That the neighbourhood of the lake, is really unhealthy*, I believe needs no proof, inquiry amongst the natives of Balighat and other places similarly situated, would satisfy any person in this respect. He would be told "the air was very bad," that the "salt air was very bad," and would find, that sickness in those places more than commonly prevails.

I have heard it said, that this lake or marsh was capable of being drained, and the lands redeemed and brought into cultivation; moreover that it would probably become valuable land for the culivation of indigo, rice, and other products. The question of draining however is one which belongs more to the province of a surveyor to decide, and upon which I am unable to form any correct opinion. The channel which runs through the lake from Ballighat to Bamanghatta, is bordered on each side with grass and jangal, and is the only part of the lake which I understand is used for the purpose of navigation, and this channel is obliged to be kept open by means of dredging boats; on the borders of it, and indeed on other parts of the lake, huts are occasionally to be seen, and cattle grazing in the jangal and grass in the water; here and there are to be met with lumps of earth above the water, and particularly *small ridges in some places along the edge of the navigable channel.* From these circumstances, and from what I have heard on the subject of draining the lake, I am rather inclined to think that something might be practicable in this respect, and I believe there are as yet no grounds for supposing it impossible to drain off the water, or by embankments, or some other means, to reduce the land now waste and useless, and a source of disease into profitable cultivation, and make it at least a comparatively healthy place. I believe that some land bordering upon the lake on the Calcutta side, and to a considerable extent, has already by means of drains and embankments been reduced from its marshy state, and either is, or will shortly be, in a state of cultivation, which is a proof, that industry may overcome any seeming difficulties and that at least some parts of this pestilential marsh may be brought into a valuable state; and if the whole, or a considerable part was reduced into cultivation, even into paddy or rice lands, the situation would become much more healthy,

* Some years ago 16 police persons were sent upon a particular duty to the borders of this Lake—every one of them became ill; as many more men were sent in their room, and these were all attacked with disease and obliged to return.

My informant was Mr. Blacquiere who saw these men. It has been said that if the lake was converted into a rice cultivation, it would be as unhealthy as it is now is. Quere, Would a double batch of men sent to a rice cultivation become thus diseased?

and the whole neighbourhood, including Calcutta, would be much benefitted by it. It is true, that as paddy or rice land it would still at certain seasons be partially under water, as lands of that description generally are; but I do not think that such lands produce the same unhealthy atmosphere as the present salt and jangal marsh now does, though they may do so in a comparatively small degree; the crop is cut down and not allowed to rot on the ground, or in the water, as the jangal does, and the land is clean for many months in the year. If by general draining, levelling, removing the neighbouring jangal, and producing as much as possible a free current of air, the atmosphere we breathe shall be rendered purer, many lives may be saved, and many who are now obliged to leave the place, may be able to remain and attend to their respective occupations.

This paper was written and given to the Governor General shortly after his Lordship had sent for me on the 2nd September, 1828.

NOTE.—*Annesley* on soils and situations productive of miasmata, &c. Page 55.—The copious extrication of unwholesome effluiva from salt marshes and partial inundation of the sea has been long admitted and has only been disputed by one writer of eminence, who instances in disproof of the position, the salt marshes of one particular district in the western hemisphere, but there it is probable that there was some peculiarity in the soil and its productions which rendered the formation of malaria impossible.

Page 56.—Experience will prove, &c. &c. when such soils have been inundated by the sea, as from the breaking down of embankments, &c. the formation of deleterious effluvia has become most abundant, and has been the source of a most devastating pestilence. In proof of this we may mention the noxious situations and salt marshes at the mouth of the Ganges, the Irrawaddy and the Indus, and numerous other places in the east. In the north of Holland the fever which was so destructive in 1826, was a very strong proof of the deleterious effect of salt water*

* "The epidemic which prevailed in Holland, and particularly in Groningen and its vicinity during the summer and autum of 1826, seems to have been owing to the partial inundations of the country by the sea during the preceding winter and spring. Through Friesland, and particularly in the Town of Sneck, observes Mr. Kerchoff (Journal complement; January, 1837) this cause appears to have had a decided influence. Sneck is a handsome and well-built town, the streets are broad, the population in 1825 was 6373, and the deaths were from 10 to 12 monthly. In the autum of 1826 it became the centre of the epidemic which ravaged Friesland and in July the deaths were 23, in August 87, in September 80, in October 127, and from the 1st to the 20th of November 62. The water in the fosses of this town is generally limpid and running and that which usually fills the adjoining ponds and lakes is equally pure, and suited to domestic purposes. But after the breaking down of the dykes in 1825, and the consequent inundations, the water became salt and brackish, and during the high and continued heat of the following spring and summer it became greenish; and so

offensive, that the workmen could not labor in the vicinity without being seized with intermittents and remittents. As the summer and autumn advanced the fever assumed a remittent and even continued form, and the effluvia from the soil became more concentrated and noxious, as the waters were more completely. Drained off by the continued warmth of the season. At the same time the bad water was used, without sufficient purification, for domestic purposes. These causes although instanced here with respect to this particular place, were also present in equal force at Groningen and other places in Friesland; the fever which was at first intermittent, assumed a continued type, and during the exacerbations the pains of the back and head were increased. In the majority of cases the liver was much effected. In the months of August and September the fever assumed the character usually presented by fevers in low and moist situations within the tropics, the circumstances occasioning them being in very respect similar."

Page 57.—The effects resulting from the inundation of the ocean are not perhaps referrible so much to the circumstance of a small quantity of salt proving a septic, as is supposed by many: for it seems evident the antiseptic properties of salt are in proportion to its quantity, and that a small portion will not have a septic tendency, because a large one has an opposite effect. The subject has not received its desired attention: and authors have, in respect to it been more prone to copy the suppositions and admissions of their predecessors than to examine into the grounds upon which the opinion is founded. *That Sea-water mixed with fresh-water and vegetable matter in a state decay, will increase the generation of effluvia* under the influence of a powerful sun, and render them more concentrated, SEEMS TO BE THE FACT. It has been *repeatedly* presented to *our notice*, and is supported by the *testimony of the majority of observers.* But this result seems to be owing to the quantity of *animal* matter sea-water contains, which occasions it to *run faster* into putrefaction than fresh-water when subjected to a warm temperature and kept at rest. Much is owing to the lowness of the situations where inundations take place, and the quantity of vegetable and animal matter in a state of decay which such situations contain, The exhalations proceeding from these places, whether within the tropics or in temperate regions during warm seasons, are generally more noxious during very moist states of the air, a condition always present in warm climates; and they are still more particularly *hurtful when* they have been collecting for a considerable time owing to the continuation of calm whether, and the absence of thunder storms, or those more violent atmospheric vicissitudes which are so beneficial in sweeping away the exhalations accumulated in low narrow ravines and among the thick underwood of tropical regions.

No. 2, 1820.—*Continuation of the same subject—Allusion to the soil around Calcutta—Sir H. East's opinion of the same after one experimental boring—Remarks on the bad effects of marsh and jungal air, allusion to cases and localities—Remarks on cultivating the Sundarbans, &c.*

To MAJOR BENSON, *&c. &c.*

SIR,

In continuation of some papers which I had the honor to give some time since for the information of the Right Honor-

able the Governor General regarding the healthiness of this Presidency and its suburbs, I have the honor now to submit some further remarks on the same subject.

In my former statement I alluded generally to the various causes to which I was led to attribute much of the unhealthiness of this place, and amongst these were various nuisances, which I took the liberty of pointing out; such as the great quantity of surrounding jangal, the numerous small dirty tanks, cavities, &c. and the general state of the drainage. I have since gone further in my investigation. This and practical observation have more and more confirmed me in the opinion that I have always entertained relative to these several causes being productive of unhealthiness by contaminating the atmosphere, and generating what is termed malaria.

That I am not singular in my opinion of the bad effect of stagnant drains is evident (in addition to other authorities which could be produced), from a circumstance of late practical occurrence, which I beg leave to quote. It is what lately took place at Gibraltar where extensive sickness had prevailed; a Dr. Wilson who was there speaks of the Augean drains, and attributes the illness to malaria. I have appended the short account he gives of it. If difficulties have existed in respect to draining in Calcutta and its vicinity, I am inclined to suppose that they do not arise from the nature of the soil, and without feeling competent to give any opinion on the practicable part of improving the drainage, I am not I think going too far in supposing that the new canal now being cut would afford a great means for the drainage of all that part of the Town to which it runs parallel. This great Improvement is now rapidly going on, and viewing it merely in one point—that of the healthiness of the neighbourhood—we have only to look at the broad belt of jangal that has been cut down for it, and the numerous small tanks which have either been cut through or filled up, to be convinced of its great benefit. Besides commercial and other public advantages, this benefit and improvement would indeed be greatly extended, if the canal was, instead of stopping at the present eartern canal, to be continued round the remaining part of Calcutta, and to join the Tolly's Nullah towards Bhawanypore or Allipore.

Considering that the nature of the soil might have much to do with the dampness and unheathiness of this part of Bengal, and having for some time past taken opportunities of collecting various peat earths that abound every where

about these parts, I had examined the earth in several places, by boring with a machine to various depths, when my attention was called to the circumstance of Sir Edward Hyde East having in 1814 made a boring 140 feet deep near the river, in search of a spring of pure water; he in a paper which he communicated to the Asiatic Society remarks, that the different strata through which the borer penetrated have furnished the following observations.

1st. "The primary object of getting a spring of fresh water entirely failed, of which sanguine expectations had been formed by the projector of the experiment, grounded as it should seem upon the common opinion that the soil of all the lower part of Bengal was particularly moist and full of springs; an opinion, which this experiment, if it can be taken as affording any criterion of the soil throughout the vicinity of Calcutta, has so far happily discountenanced. The first appearance of any damp was at the depth of 71 feet in a reddish clay with a quarter of sand, and below 76 feet the earth was as dry as before, though the borer must have descended nearly to the level of the sea, which as the crow flies, cannot exceed 70 miles in distance which the fall of the river commonly computed at 1 inch a mile is supposed to be acording to its windings.

2nd. "The damp of the climate not being attributable to the moist nature of the soil, nor affected by it, otherwise than as an admixture of saltpetere in the soil may be supposed to have some influence on the exhalations from the surface, must be looked for, principally at least, from causes upon, or above the surface, to the want of a general system of drainage in a level country, and the luxuriant vegetation, with inadequate opening through the woods for ventilation, which prevent or impede the copious falls of rains at the periodical season, and not unfrequently at other times from running off properly. The heavy dews at other seasons are not probably more than sufficient to supply the daily exhaustion of the sun, and would rather contribute to the healthiness of the climate. All that seems wanting, therefore, is surface draining upon a general plan, and the cutting of broad strait road, through the woods, as much as possible in the direction of the prevailing winds. The acknowledged improvement of the climate in an about Calcutta of late years, appears to be the natural result of the superior attention which has been paid by the Local Police to these two objects, the benefits of which will be extended with the extended application of the same means."

Years before this Rennel had made similar observations, and since the period of Sir Edward East's remarks considerable improvements have taken place, though it is obvious that much yet remains to be done. I concur particularly in his observations about the surface draining and the cutting of the roads in the direction of the prevailing winds, and I may add, that in two of the borings which I have made at a considerable distance from each other, and one of which was in the new canal, I have found that at about 70 feet from the upper surface, the yellow clay that was brought up was extremely tenacious and hard after which water came up to the surface of the bottom of the canal, but it was of a brackish nature. This circumstance tends further to prove the correctness of Sir Edward East's opinion as to the difficulty of meeting with a spring of pure water, and argues, that if such is the general nature of the soil, in digging tanks, no object is to be gained by making them of extraordinary depth, under the expectation of meeting with springs of fresh water, but that they must be considered rather as reservoirs for rain water; and for that purpose a considerable depth may be proper. But if at a certain depth, say at 60 or 70 feet, brackish water is generally found to exude from the earth, it might not be well to dig through the hard clay which is found to lay in considerable thickness above such brackish water. These investigations seem to prove that the soil hereabouts, which is unquestionably alluvial, does not contain so much moisture below the immediate surface as is generally supposed, and the production of impure air is most probably from the surface, rather than from below the surface, though possibly in other soils and climates it may be otherwise; therefore if a system of surface draining by open shallow drains were adopted the advantages contemplated by Sir Edward East might be obtained.

I take the liberty of alluding to considerable advantages obtained at Madras by the establishment of a Board of Health, and referring to the recorded opinion of the Justices of that Presidency, in their report at the last Quarter Sessions, of the utility of this board, and of the improvements that had arisen from the attention of that Government to general points of clearance and cleanliness. If in that place where they have the advantage of a sea wind, such nuisances as these alluded to are felt, it is fair to consider that they will be more felt here, where the vegetation is much more exuberant and the population greater. I would here respectfully submit, that it is worthy of consideration whether

similar proceedings to these of Justices in Quarter Sessions at Madras, might not here be attended with beneficial results, and also, whether a Board of Health at each of the large districts or divisions under the Bengal Presidency might not be beneficial. It might be composed of the Senior Military, Civil and Medical Officers; but should this not be deemed expedient, a Board or Committee of Health in the presidency itself might be attended with incalculable advantages. When I first arrived in 1816 the south-east part of Chowringhee was covered with similar huts and compounds to those alluded to at Madras; at that time I remarked certain well built houses near those parts were uninhabitable, and the damp and evening mists about them were proverbial. Some time afterwards those huts were all destroyed, several large tanks were made, and the land generally levelled for the purpose of building good houses. Rawdon street, Loudon street, Moira and Hungerford streets, were finished, and I now observe the formerly unhealthy houses I have alluded to occupied, and no longer considered dangerous to reside in*.

I alluded in my former paper to the very jangly, neglected, and irregular state of the lands on each side of the Russapuglah road leading from Birgetallah, Chowringhee, down to the place where the families of the Mysore princes reside: I am every year borne out in forming the same opinion, and coming to the same conclusions I have there expressed, by my observation and attendance upon the princes. I invariably find that when the wind blows over these jangly and swampy parts towards their inhabitants, fever and that often of the most virulent kind I have ever met with, prevails, and this more especially where the houses are low, or surrounded with marshy swamp or jangals, which is the case with several of them. There are some others where the heads of the family have built their houses, three and four stories high, in the highest apartments of which they have their zanána, and here they rarely suffer; but I know some lower-roomed houses where the grounds are kept clean and airy, where they are also healthy, although perhaps not quite so much so as in the higher houses. With the exception of accidents which occur now and then, and hydrocele to which this family seem peculiarly liable, and which often requires operation and attention, I should consider the princes generally healthy, their usual complaints being remittent and intermittent fever and its conse-

* Huts are now rebuilding and the place getting filthy. August 8, 1837. F. P. S. now much worse 1849. F. P. S.

quences, such as spleen diseases, affections of the liver, and other visceral obstructions; and although I think I am correct when I state, that since I have had medical charge of these numerous families, now nearly nine years, I do not know of any one fatal case of cholera morbus, or one fatal case of small-pox having happened, (though these disorders have yearly carried off many in the adjoining villages;) but after the last rains I had a considerable number of spleen cases among them. I expect these families will now be tolerably healthy till the rains set in, when those in jangly and damp situations must be expected to suffer. I have mentioned this regarding the princes, because the facts I think go far in confirmation of my main arguments, the unhealthiness of jangal and swamp*. It would be useless to enter into a detail of the particulars, which I could easily do, to prove the unhealthiness of numerous localities in and around Calcutta; one however I may allude to,— it is the case of the late Rev. Mr. Mosquito, a roman catholic clergyman who lately went into a lower-roomed House at Sialdah in the suburbs, which had a small compound covered ancle deep with dead leaves of trees, and close to his compound was a large tank then filling up with stable straw and other filth. His fever was of the most virulent kind, and ended fatally last Friday the 17th instant. This particular cause of illness I believe, to be very common, which makes me thus anxious to bring it to the notice of the Right Honorable the Governor General, and I may be allowed briefly to mention, that I have visited many of the villages bordering upon the Lake, and that I find the inhabitants in point of appearance and health, to correspond very much with the state of those people who inhabit malarial and marshy lands in various parts of Europe and America, as pointed out by well known authors. Since my remarks about what I had seen of the lake I have been occasionally there, and I found that much of the land which during the rains was covered with water has since been dry with jangal growing upon parts of it; the tides have now risen higher than they were two months ago, and have covered at high water part of

* Since writing this, Prince Sooroorooden has been carried off by disease, I believe entirely produced by the filthy state of his habitation—he allowed the most noxious jangal to grow all round his house up to the very doors and windows. I could not prevail upon him to remove this, and I have taken several gentlemen to the spot to shew them what a magazine of malaria existed, and how wonderful it was that life could be preserved within it. His diseases were fever, neuralgia, latterly partial insanity, and he died in an epileptic fit.

the land which had been left dry; these lands, being daily alternately wet and dry, must be a constant and plentiful source of malaria, and fortunate indeed is it for the inhabitants of Calcutta that these marshes are not situated south of it instead of where they are. From the borings I have made in many parts of them, I should say that it would prove a most productive soil, fully equal to any about here. A moderate portion only of sand is met with until you go to quite the other end of the marshes near Bamangotta, where more sand begins to appear. In parts where I bored deep, I found in my course the same charred, or peaty earth, to be found every where about Calcutta, and again below this a very tenacious yellow and slate-colored clay. Of the existence of an ancient forest, all, now covered by earth, there is no doubt whatever, as almost every where about 20 feet deep, large timber trees are found in a state more or less of decomposition, but the superfices of the salt marshes, and down to 12 feet, is certainly composed of an earth well calculated for embankment*.

These remarks bring me to the jangal and waste lands beyond the lake, and to the foregoing observations I hope I may be allowed to add a few remarks on the subject of cultivation. From all the information I have obtained, I am led to believe that these *waste lands in the Sundarbans are capable of being made to produce a variety of crops*† Some coffee plants which I gave to a cultivator of Sundarban lands last year and the year before, and which were planted out by him on the cleared lands are, I am informed, in a thriving state; it may therefore be worthy of consideration whether if this plant is found to flourish, it does not hold out an additional encouragement to the clearing of these jangal lands, I am aware that various opinions have existed respecting the cultivation of coffee in this country, and that its success has been thought doubtful; several experiments have however succeeded and the coffee is considered of a fair quality. I have myself made the experiment to a small extent, and judging from the appearance of the plants in a piece of ground of about 10 acres, I have every reason to believe that the cultivation of coffee here will ultimately succeed. I sent a thousand coffee plants as far up the country as Moradabad upwards of three years ago, and the last ac-

* Since writing this, an embankment has been made permanent on the western side of the navigable channel, nearly half across the lake as far as the Byamcarl; the lands, beyond are tolerably high, filled with jangal.

† American cotton grown in these lands and produced at the Agricultural Society has been considered excellent.

counts I heard of them were very favorable. *Cotton* is perhaps another article that might be produced to a great extent in the Sundarbans lands. In an article in the Edinburgh Review, ( No. 91, June, 1827, page 25, ) *on the rise, progress, present state and prospects of the British cotton manufactory*, it is stated, "that previously to 1790, the supply of raw cotton for the British manufacture was principally derived from the West Indies and the Levant. But after the termination of the American war cotton began to be cultivated in Carolina and Georgia, and has succeeded so well that it now forms one of the most valuable productions of the United States. American cotton is generally known by the name of *sea-island*, and upland ; the former is the finest cotton imported into Britain. It grows on small sandy islands contiguous to the shore, or on the low grounds bordering on the sea. The upland grows at a distance from the coast." This article was written before the late American tariff which has naturally led to discussion upon the cultivation of cotton, and it has been considered that it may be cultivated with great advantage in this country to almost any extent, and of a quality not perhaps inferior to that produced in any other part of the world*. From the description given in the Edinburgh Review of the kind of land on which the finest cotton grows, it appears in some measure to *assimilate to the Sundarbans lands*. I am told that the Bourbon cotton grows well at Diamond Harbour, and previous to the last rains I had some rows of the Bourbon cotton trees, in a garden, raised from the seed and thriving abundantly, but during the rains they were so very exuberant that I cut them down; two or three only were left, and although entirely neglected and most of their branches cut, they soon came into blossom and produced cotton, which I neglected taking care off, but I got from them quantities of seed which I have given away.

From this trifling experiment however it is evident that the plants would thrive here, and that cotton might perhaps be cultivated to a great extent in the low lands of the Sundarbans. Should these lands become cleared, the cultivation of sugar-cane on them may become an object of importance. It was

* On the 20th of October, 1829, the Governor General expressed a desire to assist the Agricultural Society to promote the cultivation of superior cotton and tobacco, and the Court of Directors in 1831, sent out American cotton seed, and Government sanctioned an experiment at Akra in the Agricultural Society's ground, the particulars of which will be found in their report published in 1835. The Society also sent American seed to various parts of India, and the samples of cotton sent by several of the experimentalists were excellent.

The Government has *just* offered a premium of 5000 Rupees for the best invented Cotton Chirka, 1849. F. P. S.

observed by a Mr William Fitzmorice, (who had been in the West Indies many years) in a statement he made to the Honorable the Court of Directors, and which he printed in 1793: "That the more he saw of this luxuriant soil the more he was convinced that they might annually import from Bengal any quantity of sugar, and a proportionable quantity of rum of a superior quality, without interfering in the smallest degree with the present cultivation and manufactories of Bengal. Indeed that the waste land occupied by the tigers, between this and Injella would produce nearly as much sugar as the island of Jamaica." Mr. Fitzmorice, from his printed work which I have, appears to have been practically acquainted with the cultivation and manufacture of sugar, as it was carried on in the West Indies, and was therefore probably capable of forming a correct opinion on the subject, as well as on that of the cultivation of coffee, of which he also wrote, but which coffee cultivation has only (so far as I can learn) been attempted of late years, though the plant has long since been found to grow well in private gardens; much of this land to which Mr. Fitzmorice alludes has since been brougt into cultivation. Rice is I believe the principal crop, but of the vast tract which remain in a state of waste jungal on the east of the river Hooghly, and towards the Sundarbans, much might no doubt be made productive, and if sugar should be found to thrive on those lands, it is evident that it might be cultivated to a great extent.

You will oblige me by laying this paper before the Right Honorable the Governor General at his Lordship's leisure.

(Signed) F. P. STRONG,

*April 23rd*, 1829. *Surgeon to Suburbs of Calcutta.*

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No. 3, 1829.—*Continuation of the same subject—Boring for Artesian springs advocated—Success in Europe of late years, giving the authorities—Further remarks on the Sundarbans with quotations, from Baron Humboldt on the advantage of civilization: and the Abbé Man on the healthiness produced in the Netherlands by clearing, cultivation, and civilization.*

To Major BENSON, &c. &c.

Sir,

In the papers which I had the honor to submit some time ago for the information of the Right Honorable the Governor General, I entered into an explanation of what I conceived to be some of the principal causes of un-

healthiness in Calcutta, its neighbourhood, and the lower part of Bengal. In doing this I was naturally led to make some remarks upon those great sources of malaria or impure and unwholesome air, the Salt-water Lake, and the jaugly Sundarban adjoining; considering that the draining of the one and the clearing of the other would be a great public benefit, if even done only with a view of removing such causes of malaria and consequent illness.

In carrying into effect such measures, one most important necessary of life must be obtained, or else it is to be feared that any improvements which may be attempted will proceed very slowly and cannot ultimately be carried to a considerable extent. The article to which I allude is a good and sufficiently abundant supply of fresh water fit for drinking.

This is an article even much wanted in Calcutta itself, particularly during the dry and hot months; and much illness amongst the natives has, and no doubt correctly, been attributed to their drinking dirty, stagnant and putrid water. The supply of good water might, I am strongly inclined to hope, be much increased in and about Calcutta, and that by the simple, speedy, and comparatively trifling expensive plan of boring*; should this plan be tried and found to succeed here, it might probably meet with similar success if tried upon any of the cleared lands, or upon the Salt-water Lake, when drained.

My hopes of success are in a great degree grounded upon the examples of boring which have taken place in England, where this mode of obtaining a good and constant supply of fresh water has lately been much resorted to, and has met with the greatest success, not only in London and its neighbourhood but in the lower parts of Lincoln, Kent, and other fenny districts†. In some of these where the inhabitants and their cattle suffered much from the want of good water, the evil has lately

* From M. Arago's work on Artesian springs, 1834-5.

*Issues from principal fountains*

St. André nearly two tons per minute.
Bages, 333 gallons per minute.
Tours, 237 ditto ditto.
Merton, 200 ditto ditto.
Revesaltes, 176 ditto ditto.
Lillers, 155 ditto ditto.

† Edinburgh new Philosophical Journal, December 1828. p. 170.

been removed, and this essential necessary of life has been supplied by means of perforations made to a great depth in the soil, by boring with an iron auger so as to reach and bring to the surface the deep seated springs*.

To some of the instances I beg leave to refer. Borings which have been made from 200 to 400 feet deep, have been found to cast up from 15 to 20 gallons of soft and remarkably pure water per minute, which without the use of engine or pump will rise from 20 to 30 feet above the surface up a tube or guide-pipe†. Wells have been bored at Tooting, Mitcham, and Merton, in Surrey‡; one at Merton is said to cast up 200 GALLONS of water a minute§, and one at Tooting nearly 100 gallons. At Leeds 100 yards deep has been bored for water, and cast iron pipes used for conducting it ||. Some partially unsuccessful experiments have been made in chalk¶. But water has been obtained at Sittingbourne in Kent (in which neighbourhood it may be remarked, that the land is level and low) after boring 336 feet. In Bedfordshire 400 feet and in Surrey near Dorking 440 feet in depth have been bored and water obtained**. At Hammersmith, boring is said to have been much practised lately. The water obtained there which was of a superior quality, and the supply regular, in some instances 200 or 300 gallons per hour, but in no case is it said to be less than 80 gallons per hour, and the depth bored has been from 300 to 380 feet before the water was found, after which it has run over different heights above the surface according to the strength of the spring. In the Duke of Buccleugh's

*Depths bored.*

St. Nicolas d' Ailermont through 7 sheets of water 1,130 feet.

Geneva 682 ditto.
Suresne, 663 ditto.
*Chiswick*, 582 ditto.
Bethune, 461 ditto.
1834 M. Champaiscan, 275 ditto.

* Mechanic's Magazine, vol. i. p. 293.

† Ditto, vol. ii. p. 31.

‡ Since my writing this M. Arago has particularly alluded to *this* boring.

§ Mechanic's Magazine, vol. ii. p. 60.

|| Ditto, p. 382.

¶ Since this several successful operations have been performed in chalk.

** Mechanic's Magazine, vol. v. pp. 230, 32, 258, 315, &c.

grounds at Richmond Hill*, (where an excellent apparatus for perforating the different strata of the earth is said to have been used,) after boring 252 feet, a supply of most excellent water has been obtained, yielding 13 gallons a minute, and rising as in a fountain 24 feet above the surface of the earth. These examples not only shew to what extent boring for fresh water has been practised in England, but it will also be seen from them, that this method has been successfully tried in both high and low situations and through various kinds of soil. I will also add a quotation from a work apparently of much practical utility. In Loudon's Encyclopædia of Agriculture†, p. 671, it is said there are "borings in Middlesex and Surrey which afford a continuous and abundant flew of water, equal to 8 gallons per minute. A very copious fountain which rises twenty feet above the surface, has lately been obtained by the same means in the grounds of Ravenscroft Park, the seat of G. Scott, Esq. near Hammersmith." Indeed there can be little doubt that in the majority of situations not only in Britain, but throughout the world, water might be found by boring or digging down a few scores of feet. The expense in England, as mentioned in the same work, (p. 671) is stated to be equal only to one-eighth that of well digging, and it is remarked that "the advantages of flowing springs of good water, which by these means may always be obtained on the sides of roads, and in a variety of other places where water is not at present found, are incalculable, the cost very small, and the operation easy and "expeditious."

If the advantages are so incalculable and so easily obtained in England, it must be obvious that they would not be less so in a climate like India, and particularly in this part of the country where they are so much needed, and where although the water of the Hooghly, as far down as Calcutta may be tolerably good during most seasons of the year,

* Mechanic's Magazine, vol. vi. p. 167.

† In this work will also be found an interesting account of the mode of raising lands near the river Humber by warping, or letting in the river water and allowing the warp or mud to settle. By this method lands have been fertilized, and raised from 6 to 16 inches in the course of a year. An article also in the Mechanic's Magazine, vol.—p. 99, gives an account of this method of warping lands by the water of the river Ouse, and speaks of raising lands near 3 feet in the course of a year The water of the Hooghly containing a much larger portion of mud, might perhaps be applied to the same useful purpose of raising the soil of the Salt-water Lake or other neighbouring low land.

and tolerably good water may be preserved in tanks, yet the supply often becomes scanty, and when the tanks are low, brackish and bad, boring, if successful, as I think it would be, is therefore a matter of more importance than it may at the first mention of it appear to be. In the fort in particular it might be found to afford that supply of water which all attempts to obtain have (I am told) hitherto proved unsuccessful and expensive, the wells being all brackish, and the puckah built reservoir made for the purpose of retaining a supply of rain water having after repeated expensive repairs been found incapable of holding water, and its use for that purpose being therefore discontinued. Several borings for fresh water have also been made here, and amongst them some in the fort, and the only reason why they have not been successful is, I believe, on account of the *inefficiency* of the boring apparatus, and its not enabling those who have made the attempts to go sufficiently deep. In two borings made in the fort in 1820, they were not able to penetrate deeper than 122½ and 128 feet: in both these attempts there was no indication of fresh water, but the earth brought up was occasionally damp and moistened with water of a saltish taste, a great deal of stiff clay was met with, and in both cases the *rods broke* and remained in the ground. The deepest boring I can find an account of is that given by Sir H. East to the Asiatic Society in 1814, and that was 140 feet; no fresh water was found. and here the *rods broke* and were left in the ground: the only other accounts of any boring I can find was in 1804, wells from 20 to 40 feet deep having all proved so brackish as to be unfit for drinking. The borings were undertaken for fresh springs; in the first after surface mould, sand. &c. the borer passed through hard clays with kunkur, it penetrated to 75 feet when the water rose to the height of the water in the adjoining wells; it was analysed by Dr. Hunter, he considered it unwholesome, as containing a very large quantity of common salt, muriate of magnesia and clay.

In the second the same sandy clays, kunkur and white and yellow sand presented themselves at 70 feet: the borer was brackish at 81 and at 101 feet the rods came up nearly dry. A well of tiles had been made round the borer for the first 30 feet, and the water rose into it within 7 feet of the surface, fully four feet of the ground. At this place the ground was artificial above the general level of the country. During the whole dry season the water only sub-

sided in this well 3 feet, and was on the 3rd June, 1805, only 10 feet below the surface, whilst the water in wells at a little distance was 30 feet below it. Here the lowest depth was 119 feet; coarse-grained sand was found, and the soil was very hard, *the borer broke* and was not recovered. The third was in December, January and Febuary, 1805-6; similar earths were obtained above, and from 114 to 127 feet was found fine yellow sand, coarse sand, and very hard earth—here *the borer broke and* 91 *feet of rods were lost.* At 65 feet the water was brackish, but the deeper water rose to within 4 feet of the surface, and was well tasted. The fourth attempt was in March, April and May, 1806. Similar earths presented, very hard, from 120 127½ yellow clay, sand and yellow sand; here the auger *was* partly *broken,* the edges were found sharpened like a knife. It was remarked that the water at 66 feet appeared tasteless, probably owing to the heavy rains that season in March, which had made the water in all the wells tolerable.

The late Mr. Jones, a person who was well known as having opened the Burdwan coal mines, made a boring and found the same earth and clays, but he did not go beyond 70 feet deep; here he found kunkur, clay, and yellow sand, and he says at 70 feet through a stratum of red coarse sand issues a spring which is acted upon by the tides in the river. The borings I have made have been comparatively trifling for want of proper apparatus. I however bored down to 40 feet near the west margin of the lake, where I found very stiff dark clay, and at the bottom some hard kunkur mixed with it. As I mentioned in my last paper, I bored at the bottom of the circular canal, and found water at the depth of 70 feet from the upper surface which rose 50 feet and formed a pond, which was banked in at the bottom of the canal. This water appeared to me and my friends brackish, but on its first appearance the laborers drank it and said it was good. At this place the clay which is of great depth, and in parts beautifully yellow and containing kunkur, was so very stiff, that at 50 feet a large and strong auger was twisted in a most extraordinary manner, aud two Europe-made strong iron-hooks, were broken in extracting the rods, which was done by means of a strong gin and windlass.

In a garden in the Circular Road about two miles from the above place I bored through very stiff clay to 70 feet deep, and came to some kunkur and I suspect other harder substance which prevented my getting further, and I found the auger much scratched and polished.

At Russapaglah I could not penetrate deeper than 70 feet; at this depth I applied a smaller auger to the bottom of the larger rods with a view to perforate where the large auger failed, but this broke and was left 70 feet in the ground. In these borings I found myself much disturbed by the frequent falling in of sand from the upper strata, and I had not a cast-iron tube to prevent it: such will be necessary in any future boring and a proper frame-work and mechanical means for raising the rods will also be required.

I am told that there are in Fort William different sets of boring instruments sufficient to go a depth of 600 feet or more, and that they are of greater strength and excellence than those used in 1805 and 1820; but a gentleman who has lately arrived from England informs me that a* *newly* invented borer is now in general use and much approved of.

Having given his Lordship a detail of the plans which I respectfully suggest might be adopted to obtain a supply of fresh water. I also take the liberty of mentioning a few circumstances of information which I have picked up in the course of my inquiries relative to the Sundarbans. As the circumstances tend to support the principle which I laid down in my former communication of the prevalence of malaria in all jangly, marsh and ill-drained situations, and of its effect upon the inhabitants of such places.

Baron Humboldt gives tables to prove that in certain places the duration of life has been greatly prolonged by attention to cleanliness, improvements and civilization. A little attention and inquiry will, I believe, go far to prove that there is much room for such change amongst the natives of Bengal, but more particularly amongst the inhabitants of the small and thinly scattered villages in the Sundarbans, who I am assured are a most wretched and short-lived people, continually suffering from poverty and want of cleanliness and civilization, and from disorders produced by bad air generated in the jangals surrounding them. Numerous inquiries I have made among intelligent natives confirm this, and although gentlemen who have passed through the Sundarbans may differ a little in this opinion, it is not to be supposed that their curiosity has led them to visit the villages in the interior, or to make inquiries of such a nature, An intelligent native who

* The mode is now very greatly improved, and I think the operation should be adopted in, our newly acquired territories—boring for water might have been most valuable to our army when in affnagistan.—In the Fort a depth of 480 feet was obtained, but for want of better instruments we were obliged to give it up. F. P. S. 1849.

has much experience of the Sundarbans in those lands considerably south of Tarda, has assured me repeatedly and most positively, that it is his belief that scarcely one in ten of the villagers escape fevers during the months of July, August and September. The villages he says, consist of 50, 100, or 200 people, including men, women and children. They have their native doctors, but many die annually of fever, and the spleen disease prevails very much among all, old and young; these opinions apply to the inhabitants born and always living in these jangals, whose constitutions are known to be more capable than others of resisting the poison of malaria. The darrogahs, chaprasis, and servants employed by the Government in the Salt Department* are sooner attacked, and when ill they always obtain leave to go to their homes. The villagers are generally salt molungies, wood-cutters, boatmen, fishermen; some shoot game, others collect wax and honey, and others spin and make coarse cloth for the villagers. Of the little land at present cultivated I am informed rice is the chief produce, and grain, cullie and other vegetables grow about the villages, in all which there are tanks: without a tank my informant assures me that no husbandman will settle to work, but wherever a tolerable tank is made, that of itself will bring inhabitants. I do not believe that any Europeans could live in the interior of the Sundarbans as they now are, but were it possible to clear them by cutting down and cultivating *from their external extremities* and go on *gradually towards the interior*, and if the land were *well* drained I see no reason why these parts should not be as healthy as any other place in Bengal. With regard to the external clearing I allude more particularly to the thick and low jangal bordering upon the Salt-water Lake, and which from all I can learn is more productive of malaria than the forest jangal towards the sea. If I recollect right I think Messrs. Schalch and Morrieson when surveying the Sundarbans found it so, the latter in particular as he had a predisposition to fever, and he found in the deep broad rivers where the timber tress around him were high admitting wind, and where low jangal did not prevail, that himself and his servants were well, but when he approached towards the Tarda low jangals, himself and his attendants suffered. I have

* The Government having lately removed the salt-works more to the southward has already been found beneficial to the more northern grantees, as the salt molungies have willingly become agriculturists; and it will be seen in the map that along the line of the new navigation running direct eastward from the lake, a very great deal of jangal has been cleared away.

heard of one respectable countryborn gentleman who with great industry and assiduity cleared an extensive tract of land beyond the lands I have been speaking of: he fell a victim to malaria. Another who has cultivated and cleared a good deal of jangal lands between this place and Tarda, is constantly suffering from fever though he visits his grounds only one day at a time, and that only two or three times a month. He employed as an overseer a healthy Portuguese, but he died of fever before he had been there two months.

I may here mention as regards fresh water, that this latter cultivator informs me that in March 1827 he dug a tank on a high spot, in which he found a spring perfectly pure which filled a place walled in to retain the water about two feet high, and the water continued at the height, although the two adjoining settlements and all the passengers to the amount of some hundreds went to this well daily, and if it did sink a little in the day it was sure to fill up the following morning. He made it into a tank of 10 cottahs, and it continues to supply all the neighbourhood, who without this would have to go a distance of 10 or 12 miles for water. He also says that near a village called Narrainpore there is a fresh spring about three feet from the surface, but such was the idleness of the villagers that they would not dig a tank; and when he asked them why they did not prefer living upon the higher ground on the river side, they said, they were afraid of being plundered by the boatmen, which is a common occurrence, and he tells me that no native moodie or merchant dares to settle any where except near a Company's thannah. This individual says that he finds very generally upon spots a little raised, a simul or cotton tree, which makes him think these parts were formerly inhabited; and the other gentleman found an old house. I believe that the remains of old tanks are here and there to be found*: upon the whole I have no doubt that if boring for water in these parts should be found inexpedient or inconvenient, it can be collected and preserved in tanks, at least as good as such water generally is about Calcutta, so that the want of water should not form an objection to the clearance and ultimate cultivation of these jangals which are so close upon Calcutta. But the boring appears to me to be a preferable mode as being cheaper, more expeditious, and as by going to a much greater depth

* Since this period about 100,000 biggahs have been cultivated, and in all directions the same proofs of former cultivation appears.—Still further proof of these lands having been formerly inhabited is now evident, and Government have, as encouragement to the grantees lengthened the leases of many. F. P. S. 1849.

than can be gone in tanks, the probability of getting pure water, and a constant supply is increased.

These Sundarbans—unlike the Campine of Brabant in the north of the Netherlands which the Abbè Man states "originally consisted of sand, covered with heath interspersed with lakes and extensive marshes, and here and there with woods of fir, and which tradition reports to have been once a part of the sea, and unlike the arid wastes in some parts of India,—are already fertilized in the highest degree by the decaying vegetation of years, and are, I respectfully conceive, calculated to produce a new and vast revenue to the state after a time, *and when a scheme shall be adopted that shall induce laborers to commence this work to a considerable extent** ; for it is not because the lands are barren that they are uncultivated, but chiefly because the air now poisoned by the overgrown jangal is inimical to life, and every year's progress in the removal of this evil adds, in my humble opinion, most materially to the general health of the country. Even the poor Campine of Brabant after partial failures is now stated by the above cited author to possess many extensive tracts well cultivated, and is covered with villages, well-built houses and churches. No doubt much of the country has been cultivated since the period at which Lord Cornwallis remarked that he might with safety assert, that one-third of the Company's territory in Hindustan was a jangal inhabited only by wild beasts. We know of jangal as near the presidency as Sooksagar under European management, having become invaluable land, but in the immense forest jangals and uncultivated tracts of Hindustan it is not impossible that a field might be opened in which the natives, and perhaps others, might raise for themselves an abundant supply of the necessaries of life; the field appears inexhaustible and would be employment for thousands, while the cause of much disease and sickness (both among mankind and cattle), would be gradually diminished, for it is ascertained that in those years in which malarial endemics and epidemics have prevailed, epizotic disorders have prevailed amongst cattle.

* Grants were made in 1829 and 1830 to numerous persons about Attara Banka to the extent of 50,000 biggahs, about one-tenth of which is now supposed to be in cultivation, in spite of the agency failures and the dreadful inundation in 1833; however, several grantees have done nothing and the five years having long expired the land is resumable by government to give to others who will clear it. At this time, October 1836, several pilots who have cultivated several thousand biggahs near Attara Banka, expect as good a season as they had last year which was highly satisfactory to them.

Without going into ancient authority, a late writer, Dr. Macculloch, states it as a general fact, that cattle or animals of different kinds do become sickly or diseased in the same situations which produce the diseases of malaria in the human race and that the consequences are as resembling or analogous as they could be under the differences which exist*. He states these facts to have shown themselves in Eygpt in Hungary, in St. Domingo and Gaudaloupe, as well as in France at Rochelle, and in Auvergne and Raussillan, and alludes to that particularly pointed out by Bailly, of the year 1812, at Arles; and adds that analogus observations have been frequently made in Italy ; and not to quote more than is necessary, the years 1711, 1738, 1745, 1772, 1783 and 1795, are among those which have been particularly recorded for epizotics among cattle, each of them being also noted seasons of epidemic fever, or of the prevalence of malaria ; and that further they all occured in the months of August, September, and October, and were also confined to the marshy or unhealthy districts. I am acquainted with some indigo planters who have remarked illness and mortality to prevail among cattle in times when cholera morbus has scourged the land, and I doubt not that there are many persons in Beugal who have remarked the same thing ; I myself observed the same in the neighbourhood of Dacca some years ago.

The last year has been more healthy than any I have known†, and is the first year since I have been surgeon of the suburbs that I have not had an additional number of native doctors 20 or 30, stationed at different posts with medicines and instructions to administer to every case as quickly as possible among the natives, and I believe Calcutta itself has equally escaped the scourge this year; certainly Calcutta and the Entally suburbs have been generally more healthy than usual. With my respectful apologies for the length of this paper I conclude by alluding to one or two localities, particularly this hither end of the old Entally canal, being always in a filthy state. It was only early last week that I was called in consultation with another medical gentleman to see a child dangerously ill in the house exactly at this end of that canal. My professional friend now informs me that the child is

* Macculloch, p 458. Although not noticed by Dr. M. another ancient author, Livy remarks, that in the same years in which epidemic "pestilences" appeared among the people, there was also a great mortality among the cattle.

† In the early part of 1828, there was a good deal of fever in the Entally suburbs for a short time.

doing well, but that the father and mother have since been both seriously ill, that the latter was delirious, and for some days nearly dying, they have quitted the house ; and such is the nuisance here, that a gentleman and his family have been obliged to quit the very next house to the one alluded to, which is only just behind the Marhatta Ditch, opposite the Dhurrumtollah. As the first step towards eradicating an evil should be to ascertain its cause with as much certainty as the subject will allow, in order to judge of the capability of applying a remedy by its removal, so I have little doubt, that upon examination and inquiry, the causes of unhealthiness of particular situations in the town and country might be readily traced, and in most cases removed, without so mnch difficulty as might perhaps be expected. It is not to be wondered at that particular parts of the country or the town should be unhealthy, if in the one case they be covered with jangal or swamps, or in the other they abound with nuisances which equally contaminate the air. Pure air as well as pure water is an indispensable requisite for health, but it is impossible to look at the stagnant pools of water, the dirty ditches in the native part of the town, and particularly at the low ground within the Strand road, from where the Hindu bodies are burnt almost up to the new Mint, which ground is in many places covered with stagnant filthy black water, into which stable dung and other filth is thrown to fill it up, and not to be convinced that such places must make all others near them more or less unhealthy, while there can scarcely be a reasonable doubt that if these causes were removed, the air would be more pure, and the situations now effected by them equally healthy with the best parts of the town.

23 July, 1829

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To F. P. STRONG, Esq. *&c. &c.*

My dear Sir,

I have been extremely remiss in not having executed a pleasing commission which the Governor General entrusted to me some time ago. It was to requset you would accept His Lordship's thanks for the communication you last transmitted through me for his information, and to say he esteems it an able paper.

I remain, &c.

*Govt. House,* 14*th August*, 1829. R. BENSON, *M. S.*

*No.* 4. 1830.—*Topography of the Calcutta Suburbs generally.*

Many localities have been pointed out to me as unhealthy, and the filthy state of the Mussulman burying-ground in the Circular Road, is considered particularly so as making Cossiebeggan, very unhealthy; it is surrounded by broad ditches of stagnant water, filthy to an extreme degrees. Different parts of Tiljullah and Entally are also well known as unhealthy and certain particular houses are considered uninhabitable, A few years back a great number of poor were turned out of grounds* purchased by the Lottery Committee, and they built their huts in a particular part of the eastern suburbs†, on the other side of the Circular Road, surrounded by jangal, and badly drained; so great a number died of cholera, that it was found difficult to dispose of the dead bodies; this was after a sudden change of the weather, but these new inhabitants who had located upon a mere jheel, suffered much more than others. The small houses occupied by poor Europeans and Christians of color, near and on the banks of the old Entally nullah, are dreadfully unhealthy‡, and people are constantly oblige to quit. Continuing along south of the old nullah towards the lake, there is a great proportion of ground entirely neglected and uncultivated, and this sort of ground is to be observed here and there, among garden ground, filled with high trees, the mangoe, jack, &c and much of this in a filthy state: then you come upon low rice fields, and then the borders of the lake appear. There are to be observed the remains of several old roads made by the late Mr. John Elliot, but most of these are so covered with jangal, their ditches filled up, bridges broken, and the jangal so impenetrable, that it is impossible to traverse them; the eastern suburbs I now allude to must at a former period have been in a very superior state to what they are now, and there are several old brick houses, chiefly native, and apparently deserted, which go to confirm this fact. In the south, towards Balleegunge, and near the rice fields, the grounds about the villages present numerous excavations of earth, taken for the purpose of brick-making†;

* Short-bazar grounds. † Marked on the map *Curria.*

‡ Since this was written a Mr. Ward, the senior clerk of the Sudder Board of Revenue, who I have often adviced to quit his house which was on the banks of this nullah, has fallen a victim to malaria, He was naturally a very healthy, stout, active and strong man, when he went to reside on this spot.

§ I hear that there was formerly a regulation which prevented brick-making on this side of the river, and that formerly all the bricks were made on the other side of the Hooghly.

these being left open, all sorts of nuisances collect in them, but more particularly the leaves of trees, and these decomposing with water and heat must afford a rich production of malaria. Still further south Balleegunge is jangly and badly drained, and Bhawanipore and Russapaglah present a continuance of the same evils, many parts looking more like Sundarbans than inhabited villages.

Then going back, and looking to the north of the old Entally canal the same description applies, the same obliterated roads which formerly ran north and south in the direction of the winds, which were broad and once had good ditches and bridges, all are now useless, and covered with jangal, the habitation of jackals and snakes; and the same belt of jangal and villages is continued towards the Dum-Dum road.

This constant source of contaminated atmosphere all *round our city is sufficient to produce disease, however cleanly we may be within;* but Calcutta itself has not much to boast of in that respect, although it is decidedly much more healthy than formerly, even within my recollection and practice here. The opening of roads by the Lottery Committee over parts which I have often traversed when in their unimproved state, has evidently produced a healthiness and cleanliness before unknown, and this fact goes far to prove what good may be done by the free admission of the prevailing winds, by cleanliness, and by surface draining. In the city, and in the back lanes of Chowringhee, the Circular Road, &c. the bazars, which have sprung up irregularly have become an intolerable nuisance which ought to be abated

The drains all about Colingah, and towards the Circular Road are bad generally, currants of water meeting and running in all directions. Broad roads, with good drains should be continued from the Circular Road in the direction of the plain *, which is a rice cultivation towards the lake, and cross roads should be made at convenient distances; if such roads†

* Formerly there was a very long ditch which ran out far towards the Lake, but it is now nearly obliterated. This was brought to my notice by Captain Jenkins.

† Sir Edward Hyde East strongly advised broad roads in the direction of the winds, and surface draining instead of so many deep drains as we have, which became stagnant. He thought the more superficial surface draining properly managed, would keep the upper surface of the earth tolerably clear and dry, That part of Chowringhee behind the theatre, and between that place and the burying ground, is acknowledged now to be much more healthy than it was before the new roads, tanks and buildings were made.

were made and the jangal cut down, many persons with small incomes would be glad to build in these parts, more particularly about Entally and Tiljullah from being so contiguous to town, where many of such persons have Offices to attend daily. Ballygunge is rather too far off for such people, and would appear to approximate to such places as Allipore and Garden Reach, for gentleman who can afford to have gardens and large compounds and outhouses. In all probability such new buildings in Entally and Tiljullah would be built upon an improved plan. If small houses, or indeed any houses, were built upon godowns, with apertures to keep such godowns well aired*, which might be used for Servants, or to keep things in, would it not be better than the outhouses we now see, with the high compound walls surrounding every place, and which prevents the ingress and egress of air, and renders the air the inmates breathe more confind and foul? and if *iron rails* † were more generally adopted in the place of the heavy compound walls with pompous gates, habitations would be much more airy. Large tanks upon an improved plan are much required all about Entally and Tiljullah, as well as along the Circular Road generally, and I have known in very dry seasons this want not only extremely distressing to the poor Natives, but to poor Christians also on both sides of the Circular Road, who have often complained to me how much they feel the want of this essential necessary of life. Such large tanks would not only produce mould to fill up little cavities, dirty pools, and certain unnecessary ditches, but they would, if placed where four roads meet, tend greatly to make the place more airy. I think Bishop Heber describes Mirzapore, where there was a school and some Missionaries, as dreadfully unhealthy ‡ the clearing since adopted has rendered that place very healthy ; the Bishop also I think, was told by his sirkar how notoriously bad the Entally nullah was, and that he never passed it without his handkerchief to his mouth

* Such a plan of building ought to be generally adopted in all low situations in Bengal.

† Since writing this several houses have been thus improved ; among them, three of the largest houses in Esplanade Row now are allowed to receive air, a clear breeze from the maidan which was formerly shut out by high walls.

‡ Now an excellent square, a good large tank with iron rails round the grounds, and Mrs. Wilson's school is in the corner of the square. A large building is now erecting there by the General Assembly of the Scotch Church, for the education of native youth and the place is now acknowledge to be healthy.

The natives where they reside make all their tanks small, and, as if it was intended that malaria should be produced, they seldom fail to plant trees round their tanks, so that you commonly see the surface of them quite green from the vegetation—this must have been remaked by every one; such are abundant in Intally, on the right and left side of the Balleegunge lines, and all down the Russapaglah road and Tolly's nullah, and not less so in Kidderpore. I am of opinion that trees ought never to be planted upon the borders or bank of tanks or nullahs, for their leaves invariably find their way into the water, and laying upon the edge decompose, and go much more to produce the malaria we complain of, than they can act as a surface or barrier to arrest the malaria, as supposed by some authors, although I do not deny that large belts of trees at a sufficient (I mean, a considerable) distance from a city, and properly placed, may perhaps have such good effect, but such an opinion ought not to induce the planting trees near a city, where they are certain to be injurious, not only by their leaves rotting, but by impeding the winds, and preventing the rays of the sun approaching the ground, which remains damp, and assists in the unwholesome decomposition. Such is the case in all the jangal villages around Calcutta, and is evidently the cause of the great yearly mortality in them. All the gentlemen who have gone with me in my drives, agree in the positive statement, that, throughout India, they never met with such crowded green pools, jangal and bad smells, as abound around Calcutta every where in the suburbs; and it should here be remarked as regards filthy pools, and tanks, that they may not only be the cause of sickness by contaminating the air, but may effect the natives who constantly bathe in them, as well as drink the filthy water of such tanks; for in all probability, malaria *may* become impregnated with water, and may thus be taken into the system by the skin or stomach.

For faather improvements and removing impurities of air at this presideney, the draining of the lake and cutting down the jangal beyond it, I conceive to be of great importance, The jangal all down to the sea should be removed, if possible, and it would be a great advantage if excavations, or docks, were made here and there, on each side of the river for ships and vessels to lie in, so as not to obstruct the passage of vessels to and fro. The face of the Lake may probably be materially altered. Ritchie who surveyed the Sundarbans in 1791 speak of the well known village of

Tarda, which is marked on all the maps (as being on the borders of the lake). This place is now about the same distance from the further borders of the lake, as the distance is from the Ballighat entrance, along the navigable canal to its present furthest borders, on the south, *Bamanghatta*; therefore if Ritchie was correct, a very large portion (nearly half) of the lake must have filled up naturally, for on each side of the river from Bamanghatta to Tarda, is thick low Sundarban jangal. *I imagine that upon the finishing the canal now making, and its opening into the Hooghly, that the lake will almost drain itself*—as the low water of the river Hooghly is at times lower than the Lake at low water. Whether this lake be drained, or not, or either so partially drained as to be fit only for rice cultivation, or otherwise *warped* by mud from the river so as to be converted into garden ground, nevertheless, it is highly desirable for the general health that not only the grounds on this side of it be cleared and improved, but that the Sundarbans beyond it be removed as far from the capital as possible.

*No.* 6, 1828.—*Letter to Sudder Nizamut Adawlut on the state of grounds near the Insane Hospital, and generally throughout the suburbs; pointing out the general unhealthiness produced by their jangly anb filthy state, with additional remarks made at a latter period on the effects of the inundations.*

It will be seen that the number of Deaths in the Insane Hospital in these six months has been only 10, a number considerably less than has been usual during the same period for the last 12 years It appears to me that this advantage has been produced by the making of four sunken and covered necessaries, the nuisance having previously been conveyed by an open drain from the hospital and round the grounds.

I have the pleasure also to report that there has since been much less illness than usual, which I consider mainly attributable to the improvement and change above alluded to. I beg leave, however, to remark that the grounds contiguous to, and outside of the hospital premises, are in my opinion a most unwholesome nuisance, particularly during the rainy season, the water not being drained off, but lying in the various hollows, there stagnates; and corrupting all vegetable and animal matter it meets with, produces an atmosphere most unwholesome even to natives who are used to it.

There is also close to the entrance gate a burying-ground which brings together dogs, vultures, &c. which of themselves are a considerable nuisance, and upon which grounds the prisoners from the jail of the 24-pergunnahs are daily taken in a body for their necessary occasions. Were they to be taken nearer to the nullah to which this ground adjoins, or elsewhere, for such purposes, and the practice of burying discontinued at that place, it would be not only desirable but would conduce to the healthiness of the hospital.

While remarking on the state of the grounds near the hospital it may not be irrelevant for me to observe, that having for upwards of twenty years applied my attention, particularly, to atmospheric causes of disease, and having now, for several years, been surgeon of the suburbs of Calcutta, I may not be going far, if at all, out of my line of duty in pointing out that I consider much of the unhealthiness of the suburbs, as well as of Calcutta, during and after the rains, to arise in a great measure from the state of the lands in the suburbs immediately round about the town, but more particularly in the Soorrah, Entally, and Balleegunge part of the suburbs. The lands bordering upon these parts, especially to the eastward, are not only more covered with jangal and decaying vegetable matter than elsewhere, but in almost every part of them numerous irregular excavations are to be met with, made for brick-making, and for similar purposes. In these various holes and cavities impure air is generated by the decay and putrefaction of vegetable matter in water, and if impure air so produced is, as it is known to be, capable of causing fever and dysentery, it is not unfair to conclude that certain modifications of this malaria may also be the cause of cholera, which disease predominates in those climates and soils in which fever and dysentery abound. That it may be so produced, is I think sufficiently obvious by the well ascertained fact, that ship's crews in a state of perfect health and a considerable distance, even some miles from the shore, have by a sudden land wind coming on been fatally attacked by the scourge. A striking instance of this nature is recorded by Dr. Macculloch in his very valuable work lately published on the subject of Malaria, a work entitled to the particular attention of medical men and others in this country which is so pregnant with this source of disease. I will here add that I can name at this moment several families about Entally where the whole family are laid up with fever produced most indisputably by the impure air generated about their neigh-

bourhood, by the decomposition or decaying of vegetable subtances, and several are now removing up to Chinsurah and to other places, their removal being more conducive to their recovery than any medicine they can take while they continue to breathe this atmospheric poison.

(Signed) F. P. STRONG,
*Surgeon to Suburbs of Calcutta.*

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*Copy from the 9th Paragraph of my Letter to the Medical Board, dated March 21st,* 1835.

The same patients (alluding to the patients of the Native Insane Hospital) after being discharged, apparently cured, coming into the hospital again and again from obviously unhealthy localities, and other considerations connected with unhealthy situations which would embrace too much space to enter upon at large in this Report, tend to confirm me in my opinion that in the climate of this part of Bengal, atmospheric malaria, aided by the sudden variations in the temperature of the air, and consequent sudden check to perspitation,—by bad food, poverty, miserable clothing, and housing in huts crowed together in swampy filthy situations, with a want of cleanliness and ventilation,—by the habits of long fasting and the use of impure water, (this being the usual mode of existence among the lower orders of Natives,) is highly calculated to produce diseases which often ultimately end in insanity.

This general cause of disease which so much predominates in the suburbs of Calcutta, I forcibly brought to the notice of the Sudder Nizamut Court in the year 1828. About this time I was requested to wait upon the Governor General, and I afterwards wrote several papers upon the subject to his Lordship, in which I entered into an explanation of what I conceived to be the principal causes of unhealthiness in Calcutta, its neighbourhood, and the lower part of Bengal. In doing this I was naturally led to make some remarks upon those great sources of malaria, the Salt-water Lake and the jangly Sundarbans adjoining, considering that the draining of the one, and the clearing of the other would be a great public benefit, if even done only with a view of removing such causes of malaria and consequent illness.

In some of the unhealthy spots, but particularly that broad belt of dense jangal and ill drained ground, which exists from the Dum Dum road, and is continued through Sialdah, Entally, Balleegunge, Bhawanipore and down the Russapuglah roads, reside a vast number of people of all denominations connected with the city of Calcutta, and who are constantly suffering from illness, which I conceive might be in a great degree obviated by removing such evils by a proper system of large clean tanks, with no trees upon their banks, raising the ground, regulations against nuisances, and good draining. Were this or some similar plan adopted, we should get air more fresh and free, and a heathiness would I think be obtained that does not now exist.

In one of these papers I have alluded to, as having formerly written, I particularly mentioned that the year 1828 was a more healthy year than any I had known; I did not then anticipate that the following years would have been so calamitous*.

The last five years, the period for which the Medical Board require to be furnished with the details before alluded to, have been unhealthy to a degree unheard of or unknown before, owing no doubt to the inundations which have extensively existed to an unprecedented degree, particularly in the four last years, aninundation having occurred in each year sweeping away a great part of the population between parts of the 24-Pergunnahs to the southward of Calcutta and the sea, and spreading over other lands to an enormous extent, destroying the cattle, and the produce of the earth, which has not yet recovered from its effects. Most of the wretched inhabitants of these before populous districts who were not drowned, fled towards our city, and several of these unfortunate beings became inmates of the Insane Hospital. One instance in particular I would wish to be allowed to refer to, as it is a strong case in illustration of the deep distress that musthave been felt, and as exemplifying one of the causes of insanity

The establishment at Gurriah-haut for affording them relief having been some time broken up, these poor unfortunate and starving wanderers were sent to my hospital at Allipore, where I had frequently 60 or 80 of them at a time in hospital. One poor woman was quite frantic; she would not be comforted or silenced, and becoming obviously insane, she was transferred

* The paper was written in July, 1829. For a short period about the middle of the year 1828, there was a good deal of fever in the Entally suburbs, but the following twelve months were healthy.

to the Insane Hospital last December. There she would take no nourishment, she said the floods had robbed her of her children, and she died in a few days of extreme exhaustion*.

Three of these inundations in the lower parts of Bengal to which I have referred were from the sea, and the other, the last, was produced by the overflowing of the Damoda river. These particular floodings, I mean the sea and the Damoda river, are unfrequent when compared with the overflowings of the Ganges, which are more frequent, and seldom attended with equally serious consequences. It will be seen by a reference to the transactions of the physical class of the Asiatic Society, page 260, part I,—"That an inundation of the sea, or of the Damoda river is supposed not to happen oftener than once in a century. That remark is in allusion to the dreadful inundation in 1823, and I can find no other account of any sea inundation except the eventful one of nearly a century ago, which happened in the night between the 11th and 12th October, 1737, to be found in the Gentleman's Magazine 1738-9: besides great damage to shipping and boats, 300,000 souls are said to have perished.

I know of no written record as to the effect of this sea inundation upon the health of the inhabitants, although it was an event sufficiently remarkable to be handed down from father to son, and I have met with old natives who have heard of it from their fathers. But of the late inundations which I allude to, their effects are so generally known that it is unnecessary for me to dwell upon them, although I may be allowed to add from inquiries I have made that these effects have not been confined to the poor alone, but that landholders of respectability and their families have been carried off by disease, and this over a vast extent of populous country, and particularly so in parts bordering on our south and south-east suburbs of Calcutta; and great numbers of these zemindars who fled to Bhawanipore, and to this city for change of air and medical attendance, died of the diseases produced in their villages. In coroboration of what I have stated as to the general unhealthiness produced by

* September 21, 1833. I was asked by the magistrate, Mr. Barlow, to suggest any means for arrangements, so many prisoners and paupers being sick, he did not know how to lodge them, to which on the 22nd I replied, that "if the paupers increased greatly the old Bhawanipore guard, into which we put the Nazir's people with evident advantage might be available upon this occasion" and I recommended the removal of convalescent ulcers to the jail to make room for paupers in the hospital while the guard was getting ready.

the inundations and the consequent impure atmosphere, I beg leave to mention a few particular examples which I have learnt. One native gentleman of wealth assures me that his property has been greatly increased by the numerous deaths in his family; and another old gentleman has often enumerated to me the dreadful mortality which has deprived him of all those relations of his who lived beyond Gurriah-haut, about Barriepore. Another native who is interpreter to the Mysore Princes named Nilcomul Bonnerjee, who resides at Bhawanipore, writes me that his wife a few days after the inundation of 1833, went to her father's at Barro, a village three coss south of Barriepore, in a pregnant state, and found two, three and four persons die every day at each house; that they wanted hands to bury the dead; that in two or three days her mother, brother, aunt, uncle and nine near relations died; she was confined, and there was no one to look after her. The writer, on hearing this, sent three women and four servants, they all returned ill to his residence, and with exception of his wife and child, they all died in a week. Ever since his wife has been ill with fever and spleen until lately cured. He states that at this time the number of children daily sold by destitute parents in the 24-Pergunahs is enormous.

I have a letter before me signed by the old gentleman, he writes—" In confirmation of the truth of Nilcomul Bonnerjee's letter, I can say that I had thirty relations residing in the neighbouring villages in 1832-3: only one boy is now living, but ill with spleen, out of all these relations. A great number of respectable families suffered as Cossinauth Mullick, Bhagwan Chowdry and others of opulence and respectability. The first and twenty others (being the whole of his family), all died except one girl; and the last and about eleven in family all are dead but one boy who ran away to his uncles. This misfortune was almost universal."

It would not be difficult to add many similar examples, all equally proving the wide spread devastation and death caused by the flood and the impure atmosphere; and I have given the above information in the same detailed manner as I have heard it to shew the vast extent of general mortality. Many must have been lost in obscurity, for when we see families possessing the necessaries and comforts of life suffering to so great an extent, it may readily be conceived how great must have been the sufferings of the poor, abject and starving.

*Copy of the 9th paragraph of my letter to the Medical Board, dated January 27th, 1834.*

There are in more distant parts of the suburbs, guards or depots of prisoners who are not so comfortably provided for as those in the jails, and I have sometimes had occasion to remark upon their unhealthiness, particularly the one at Garden Reach, which was situated in the midst of drains, and from which five cases of cholera came into the hospital in four days. The Nazir's guard situated in Kidderpore was so unhealthy in the last quarter of 1832 that fourteen cases of most malignant cholera came into the hospital from that guard in less than a week, as was noticed in my returns.

(Signed) F. P. STRONG.

Both these places are now much improved.

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*No. 7.—Letter to Major Benson returning the late Dr. Buchanan's papers, and sending for the information of the Governor General, some papers written by Capt. Jenkins.*

To Major BENSON,

*My. Secy. to the Governor General.*

My dear Sir,

Pray except my best thanks for the papers on the means of promoting the health, comfort and convenience of the inhabitants of this city, which I now return with many apologies for keeping them so long, Not trusting my own judgment regarding the nuisances of the town, I sought the opinion of Captain Jenkins who has written some papers on several of the nuisances, and proposed to remedy some, and with his permission I enclose them for the perusal of the Right Honorable the Governor General. I will only in this place venture to express a hope that when the new eastern canal is finished, that the levels of Calcutta will be efficiently taken, and something in the way of draining the town done.

Regarding the suburbs, the paper marked No. 21 exhibits a deranged state of things similar to what now actually exists. Many of the recommendations there suggested to drain and level the grounds about Kidderpore where the stagnant water is represented as being injurious to persons residing in that neighbourhood, and on the grounds both on the right and left of the Allipore road, just beyond the bridge, now particularly apply. It is also there stated, that the grounds behind the General Hospital had been represented as having been inju-

rious to the invalids in hospital, a road is proposed to be made from this part towards Bhawanipore, or the Russapuglah road, and one crossing this from near the hospital southward to Kalighaut, and it is remarked that these roads would be of material consequence to the natives. A cut also from Tolly's nullah behind the General Hospital is suggested. If such cut or canal was made to join the new eastern canal now nearly finished in the north-eastern division of the suburbs, it would of course be extremely desirable for the drainage of Chowringhee, and all that part of the city; the bad state of drainage, jangal and swamps througout the suburbs, and particularly down the Russapuglah road I have already brought to the notice of the Governor General, and must not now intrude further upon his Lordshp's valuable time, but subscribe myself with many thanks to you,

Yours, &c.

*4th October*, 1830. (Signed) F. P. STRONG.

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*No. 8.—Letter from Major Taylor calling on me to attend committee at the Government house on draining Calcutta, the Lake, &c.*

To Dr. STRONG.

My dear Sir,

The Governor General has desired me to request you to meet the gentlemen named in the margin* at the Government house on Tuesday next at half-past two o'clock P. M. for the purpose of considering the drainage of Calcutta in connection with the present circular canal, and the project of extending it round the Salt-water Lake into the deep water channel at Bhamunghatta, together with the drainage and silting up of the Salt-water Lake.

Yours, &c.

*Govt. House, 27th December*, 1834. T. W. TAYLOR.

| | | |
|---|---|---|
| *D. McFarlan, Esq. | —Honeason, Esq | J. R. Colvin, Esq. |
| R. D. Mangles, Esq. | J. Kyd, Esq. | J. Prinsep, Esq. |
| Capt. Steel, | Capt. Fitzgerald, | Capt. J. Thomson, |
| Dwarkanath Tagore, | Ramcomal Sein, | Capt. Forbes. |
| Col. Galloway, | Col. Tickell, C. B. | |

*No. 9.—Letter to Mr. Mangles transmitting some of my papers.*

To R. D. MANGLES, Esq.

*Secretary to the Government.*

Sir,

It affords me considerable pleasure to observe that the Medical Topography of this city, and its suburbs, is exciting attention, and as it is likely that this subject in connection with the fever hospital may be brought before the Government, I feel it is in some degree incumbent on me, from the situation I hold, to forward to you, to be laid before Government whenever the subject may be brought to their attention, some papers shewing that so long ago as the year 1828, I had addressed the Sudder Nizamut Adawlut, as well as the Right Honorable Lord William Bentinck, and on a later occasion, the Medical Board, upon the same subject, and it will give me great satisfaction to find that some active measures of improvement result from the present discussion.

I am, &c.

*Calcutta, June 18th,* 1835. (Signed) F. P. STRONG.

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*No. 10.—Acknowledging their receipt.*

To Dr. F. P. STRONG.

*Assistant Surgeon of the 24-Purgannahs.*

Sir,

I am directed by the Honorable the Governor of Bengal to acknowledge the receipt of the interesting papers to which your letter of the 18th instant gave cover, and to assure you that your opinions will not be overlooked when the matters to which they relate come under the consideration of Government.

I am, &c.

(Signed) ROSS D. MANGLES,

*Secretary to the Government of Bengal.*

*Fort William,*
*the 23d June,* 1835.

*No.* 11.—*Letter to Magistrate of 24-Pergunnahs on Census of the Zillah.*

To A. SCONCE, Esq.

*Magistrate of the 24-Pergunnahs.*

Sir,

I have the honor to enclose for your information a copy of a letter which I have this day received from the Medical Board, requiring my opinion in a statistical point of view.

To enable me to come to some conclusion upon the subject, I have already obtained, from different quarters to be relied upon, the mortality within the city among the different sections of society, for the last twenty years. But with regard to the suburbs, and the 24-Pergunnahs, I have only been able to obtain the mortality among the prisoners for that period.

I am aware that a census was not long ago taken by the sergeants in the suburbs, of the population within that portion of the district, but I fear from inquiries I have made, that it is not very accurate, and I am told that a more accurate one, including also the deaths and births, and distinguishing the Hindus and Mussulmans, might be obtained if you were to issue a purwannah to the heads of villages, who I am told are designated munduls, or punchayuts. With reference to late orders of government upon the subject of affording information, I beg leave to suggest the above plan, and should you approve of it I shall esteem it a favor if you will follow it up and oblige me with the result.

What I am anxious to obtain is a correct census of the present population, and the deaths and births for any short time previous to this period, so as to enable me to form an opinion of the comparative healthiness of this district, including the suburbs and the 24-Pergunnahs; and in ascertaining the number of deaths, it would be desirable to note down separately, those adults of the age of 16 and upwards, and of those below that age.

I have, &c.

(Signed) F. P. STRONG,

*Surgeon to 24-Pergunnahs.*

*1st. August,* 1837.

*No. 12.—Letter from Magistrate of 24-Pergunnahs.*

To F. P. STRONG, Esq.

*Surgeon of the Zillah 24-Pergunnahs.*

Sir,

I have the honor to acknowledge receipt of your letter dated the 1st instant. I have issued instructions with a view to obtain the information to which you refer, but I fear the result will not afford that minuteness of detail, or that accuracy you may consider desirable

2. It is my object to ascertain as accurately as may be, the number of villages or hamlets in the district—then the number of houses in each village or hamlet, and by reckoning the number of inhabitants in each house within certain villages and in different parts of the district, a general average may be struck, which should give satisfactory data, though not so accurate as might be expected from a well organised system of statistical record.

3. As the inquiry proceeds, if it appears practicable, the minute enumeration of every individual of each pergunnah, and of the births and deaths, of a given period may also be attempted.

I have, &c.

(Signed) A. SCONCE,

*Zillah 24 Pergunnahs, the 7th Aug.* 1837. *Offg. Magistrate.*

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To F. P. STRONG, Esq.

*Surgeon of the 24-Pergunnahs.*

Sir,

To enable me to furnish the information respecting the health of the native population of this district during the last four months, required by the 3rd paragraph of Mr. Secretary Mangles' address to me dated the 8th instant, as noted in the margin*, I shall feel greatly obliged by your supplying me with any particulars on the subject that your professional duties may have put you in possession of.

I am, &c.

JOHN C. ERSKINE, *offg. Collector.*

*Collrs. Cutchy.* 24-*Pergunnahs,*
*The* 17*th August,* 1837.

* The state of health among the native population during the last four months, particularly specifying if the rates of mortality have been greatly above the average in any quarter

## Census of the Population in the Suburbs of Calcutta.

| Names of Thannahs. | No. of Villages. | No. of Mehals. | Resident Hindu adults. | Hindu Children. | No. of Hindus in Service. | Resident Mussulman adults. | Mussulman Children. | No. of Mussulmans in Service. | Native Lodgers or Passengers. | European adults. | European Children. | East Indian adults. | East Indian Children. | Total Inhabitants. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thannah Sulkeah,.. . | 132 | 258 | 33,223 | 20,342 | *8,106 | 12,154 | 4,395 | *2,019 | 3,153 | 43 | 24 | 63 | 49 | 73,446 |
| Ditto Chitpore,..... . | 8 | 33 | 14,177 | 5,286 | 984 | 1,627 | 601 | 199 | 875 | 23 | 7 | 53 | 1 | 22,650 |
| Ditto Manictulah,.. . | 31 | 42 | 20,627 | 6,173 | 30,100 | 13,201 | 9,661 | 3,098 | 3,883 | 441 | 67 | 759 | 123 | 54,935 |
| Ditto Tauzeeraut,.. . | 29 | 84 | 22,032 | 5,349 | 1,120 | 8,601 | 2,755 | 647 | 5,072 | 54 | 15 | 45 | 27 | 43,950 |
| Ditto Nowbazaree,... | 1 | 28 | 8,465 | 2,689 | 799 | 5,845 | 2,214 | 987 | 2,818 | 63 | 3 | 50 | 65 | 22,212 |
| | | | | | | | | | | | | | Grand Total, | 217193 |

* The columns are not included in that of the Total.

## No. 13.—*Letter to Collector on Public Health in the 24-Pergunnahs.*

To the Honorable John C. ERSKINE,

*Collector of the 24-Pergunnahs.*

Sir,

I have the honor to acknowledge the receipt of your letter of the 19th instant, requesting my opinion as to the health of the native population of the district of the 24-Pergunnahs for the last four months. If we may consider the mortality among the prisoners as affording data to estimate the mortality in the district, I should say that the last four months have not been unhealthy, when compared with the same months for preceding years. Among the prisoners for life confined in the Allipore jail, I find the mortality has been less than six per cent per annum; while the mortality among the prisoners in the zillah jail, including those upon the roads in the suburbs, amounts to only a little more than four per cent per annum, and among these were some who were returned in a dying state from the Burdwan roads.

From the reports I get from the native doctors stationed in different parts of the suburbs with the prisoners, and who assist in administering medicine to villagers when cholera prevails, I learn that there has not been much sickness in the suburb villages. As regards the interior of the 24-Pergunnahs, I am told by well informed persons with whom I often communicate, that although the population is wonderfully decreased since the inundation, yet, that the health of the people generally is rather better than usual, and that they look forward with better hope for good crops on their lands, since the rains commenced, than they did a fortnight ago, when they were much depressed by the extreme heat, and the *expectation* and *fear* of a bad harvest. Such I believe to be the honest state of things as far as a considerable part of the population are concerned; but it is admitted that there are some parts of the district where some of the tanks remain brackish, where the land has not quite recovered the effects of the inundation, and where the zemindars cannot induce rayats to locate.

I am unable to speak accurately as to mortality generally but to show that I have endeavoured to obtain such information, I enclose you my letter to the magistrate, and that gentleman's answer thereto, written previous to your application to me, and with his assistance I shall be most happy if

in future we should be able to ascertain these matters with some degree of certainty.

I have, &c.

(Signed) F. P. STRONG,

24*th Aug.* 1837. *Surgeon to* 24-*Pergunnahs.*

To R. MACAN, Esq.

*Officiating Registrar of the Sudder Dewanny and Nizamut Adawlut.*

Sir,

As I am endeavouring to make a table of the mortality of different sections of society, and as I have already succeeded in obtaining that of the Hindus and Mussulmans within the city of Calcutta for the last five years, and of the other communities for the last twenty years, and as I have ascertained the mortality among the prisoners within the Allipore jail, as well as those of the 24-Pergunnahs, for twenty years also ; I am desirous if possible to ascertain what may have been the rate of mortality of the prisoners who were sent from the different Bengal zillahs to work upon the great roads, from the time they were first sent—(which if you have obtained answers from the circular you sent, similar to the one I received) you will see at one view.

As these are a class of prisoners peculiarly circumstanced, I may be able to judge how their health has been affected, as compared with those who have not been sent to so great a distance. When I am favored with the old medical returns to your court *anterior* to the year 1817, which I understand I shall obtain I shall be able to make a comparison of the health of the prisoners *before* the great jail at Allipore was built, with their state since the erection of that capacious and *airy* building in which prisoners, entering often in advanced ages, and remaining there for life, present a mortality of 5¼ per cent. per annum; and with a view to carrying my investigation further I may add, as regards the general population of the district, that our magistrate is endeavouring to ascertain the census of the population, with the births and deaths of the Hindu, and Mussulman population. Should you have received answers to all your circulars upon this subject above alluded to, I shall esteem it a favor if you will obtain the sanction of the Court of Sudder Nizamut Adawlut to my being allowed the papers, or otherwise, a statement of such

mortality occuring among the prisoners on the great trunk roads, from the time they were at first so employed, to the time of their being broken up and returned to their zillahs.

I have, &c.

(Signed) F. P. STRONG,

*Calcutta, the 7th Sept.* 1837. *Surgeon to 24-Pergunnahs.*

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19*th February*. 1838.

To WILLIAM COBB HURRY, Esq.

*Secretary to the Municipal Committee.*

Sir,

I have the honor to acknowledge the receipt of your letter of the 10th instant, and feel flattered that the Committee of Municipal enquiry consider the Papers on Topography of use. In these Papers, I had, in that part which relates to the comparative mortality of Europeans, in my general Tables of Mortality for Calcutta, annexed to my Topographical Papers, purposely left out the Soldiers in the Fort, as well as the Sailors belonging to the Merchant Ships of this Port, because their numbers vary, and they cannot be considered as actual residents; the addition of them therefore to the number of European residents, would not only have rendered the subject of mortality more difficult than it at present is, but would have presented a ratio of mortality amongst the settled Europeans higher than it is in reality. In this latter class, the proportionate mortality might naturally be expected to be less than amongst a class of men such as Soldiers, and especially Sailors, whose habits and mode of living expose them more to effects of climate, than the ordinary European inhabitants.

2. Finding inquiries made as to the best mode of making tanks, I am led to suppose the Municipal Committee contemplate the excavation of such reservoirs of water in localities most desirable for the convenience of the public, and as I have on a former occasion examined the soil about Calcutta and its neighbourhood, it is possible that what I have to offer upon the subject of tanks may be considered of some utility.

3. I believe it will be found that the soil generally is of such a nature that if tanks are properly constructed they may be made to retain the rain water from year to year, without the necessity of introducing river water into them.

4. The upper soils are found almost universally to be very sandy, and calculated to allow the water to escape from the tanks by percolation; but if the clays, which fortunately for Calcutta are sufficiently near the surface to form the beds or floors of tanks, were dug down to, as they lie on an average at about 22 feet deep, and the same clays, a little modified, used to line the sides of the tanks as high as their upper margins, it seems to me probable that this lining (or puddling) would, if properly performed, prevent such percolation, whilst it would also prevent the admission of any impure or brackish water from the interior of the soil into the tanks, which I conceive often renders their water somewhat analogous to the well water, which is every where more or less brackish from its infiltration through the earth, and particularly through the stratum of sand which is a little above the clays.

5. I think I am borne out in this view of the subject by the nature of the soil, as ascertained in the following experiments which I refer to as the result of certain borings I formerly made in the line of the Circular Road, on each side of the Maharatta Ditch, and to the eastward, on the western margin; as well as in various other parts of the Salt-water Lake, with a view to ascertain the nature of the soil.

6. I will begin with the boring at the Baug Bazar Bridge, when the soil was being removed for the present Circular Canal. The Canal labourers had dug a well 21 feet deep from the floor or bottom of the Canal. The whole depth of this well was entirely clay, very compact, and slate coloured, the auger was applied to the bottom of this well, and continued to bring up a similar kind of clay, in part of which was mixed a good deal of peat earth, very black and capable of being burnt. This clay continued to the depth of 96 feet from the floor or bottom of the Canal. At 93 feet we seemed to have tapped a spring, for the rods suddenly dropped two or three feet without the least pressure or moving round, into strong sandy and reddish gravel, and, on withdrawing them, up rushed a column of water which filled the shaft of the well in five minutes, and flowed over the wooden platform on the top of the well, with so much force, that we had great difficulty in stopping it, though the platform was embeded in the clay and had only a hole in the centre, sufficiently large to admit the rods with a small auger. A quantity of very tenaceous clay which had been excavated in making the well, was close by, and with this we thought we had stayed the flow. With a view to ascertain how high

this water would rise in a tube, we put one of wrought iron down, which not being quite water-tight, failed and the following morning early, the late Mr. Kyd and myself conveyed a long leaden tube to the spot but we found the water had broken through, and so filled the canal, that the labourers upon that work had found it necessary to remove our Gin, &c. and we of course were obliged to give up this operation.

7. This experiment in some degree corresponds with the boring which I had previously made about the centre of this canal three miles from this spot at Sealdah; with this difference, however, that the clay at the latter place, Sealdah, was extremely tenacious, and of a bright yellow colour; and, instead of the water rising from 96 feet, it rose from a depth of 50 feet from the platform at the bottom of the canal, or, 70 feet from the surface. Here there was no well, but we bored in clay nearly the entire depth, and so stiff was it that two large Europe-made iron hooks were broken in extricating the rods from out of it. No water appeared till reaching the depth of 70 feet, but at this depth the water overflowed into the canal with much force. Its purity was doubtful, but in the boring at Baug Bazar, the water was entirely sweet. It is therefore difficult to say, whether at the latter place, the water came from the *river*, or from an *artesian* spring such as we are in search of.

8. On this boring I have remarked, at page 50 of my Topography, as the result of my observation at that time,—April 23rd, 1829, "That in digging tanks no object is to be gained by making them of extraordinary depth under the expectation of meeting with springs of fresh water, but that they must be considered rather as reservoirs for rain water;" and every experiment since has led me to believe that the Calcutta tanks are not supplied by springs but by rain water, which drains into them from the surface, and oozes through the sandy stratum which is above the clay. From the latter source, particularly, much brackish and impure water is admitted. If, in making new tanks, the stiff clay, which is quite impervious, be dug down to, and then made to form the bed of the tank, I do not conceive that this clay would mix or unite with the water to make it impure, like the water that passes through the saline upper soils, and which might be prevented percolating through the sides of the tank by properly puddling them with some of the same clay a little modified.

9. As for the tanks draining the water from the surrounding soils, I submit that there is porous earth enough every where to take those waters off.

10. The bottom of the tanks then having an impervious stratum, if the sides be properly puddled or lined, the only consumption of the rain water from these tanks will be by evaporation and use.

11. By these means a quantity of this valuable article will be retained in these reservoirs which is now lost, and besides the purity of the fluid itself being preserved, the poorer classes of our native subjects would have an abundance, where now they have only a scanty supply, and that of the worst description.

12. Should it still be found necessary to resort to tanks for water for the roads, some of the present reservoirs might be set apart especially for the purpose and they might be filled from the river when occasion required.

13. To shew that at no great depth stiff clay abounds in all directions, quite applicable to the purpose of forming impervious floors to tanks, and which if not of itself, yet, when mixed with other materials, such as are used for lining (or as it is called puddling) the sides of canals in Europe, is calculated to line or puddle our tanks here, I beg to append a series of experiments made by me in continuation of my borings.

14. In a garden on the Calcutta side of the Circular Road between the Durrumtollah and the Burying Ground, I found the usual layer of peat earth and stiff clay within the range of tank-making, and in this clay, at the depth of 70 feet from the surface, hard and large pieces of konker. The difficulties we met with at this depth were so great that we were obliged to abandon to experiment.

15. About two miles eastward of this last boring, and the one at Sealdah before alluded to, which are nearly two miles apart, I bored in ground near the margin of the Lake, again at the distance of two miles, to the depth of forty feet, and in both cases, soon came to the same charred, peaty earth, and stiff clay. About a mile more eastward within the Lake, on the banks of its navigable channel, the same appearance to the depth of forty feet presented itself. I now entrusted the further operations on the Lake to a man I could depend upon, who took the coolies I had hired for the purpose, to the northern division of the Lake towards Dum-Dum; also

to the eastern parts, and to the southward as far as Bamaunghatta. They brought me from all the different borings samples of earth of the same kind as I have described, with this exception, that towards Bamaunghatta the earth was a little more sandy, that brought from Tardah, five miles beyond the Lake, was perhaps yet more so. I have since examined the soil at the salt works now making five miles beyond and south of Tardah, and found there still less clay and more sand. Indeed so much does the silicious soil predominate that the embankments are with difficulty made at this place, while on the other hand, the clay so abounds on the Calcutta or western side of the Lake that the bunding of the salt works at Balliaghaut was effected with ease, and the excavations now making on 150 bighas of Lake ground as a dock to contain 200 river craft, shew a superabundance of excellent clay near the surface in all directions, and from this spot there is now an excellent embankment formed, which is continued nearly half through the Lake.

16. For information upon the subject of puddling, I would refer to London's Encyclopædia of Agriculture, 2nd edition, page 620, article 3824, and for further information, that author refers to the works of Philip, Fulton, Chapman, Plymley, Bladestade, Kindersley, Anderson, Telford, and the article Canal, in the three principle Encyclopædias ; but as the Members of the Municiple Committee may not at the moment have these works to refer to. I may mention that it appears from the experience of others that the best coating or lining, for the sides of tanks or canals, is a soil consisting of argillaceous and siliceous earths, well mixed together, both of which I have reason to believe are here everywhere abundant ; at any rate this much is certain, that about the depth of 20 feet, a blue clay and sand exists, and if not already fit for the purpose of puddling or lining, could be readily made so.

I have the honor to be Sir.

Your obedient Servant,

F. P. STRONG.

*Calcutta, 17th February,* 1838.

N. B.—Since the commencement of my inquires it has been ascertained satisfactorily that the whole soil of the Lakes possesses sufficient tenacity to admit of embankments in every direction.

*June* 18, 1840.

# YEARLY REPORT

FROM THE

# SURGEON 24-PERGUNNAHS

ON THE

# Dieting of Prisoners, &c.

*Report for the year* 1847, *of the Surgeon of the* 24-*Pergunnahs to the Inspector General of Hospitals, shewing the advantage of good food and other care in lessening mortality, also more particularly the necessity of animal food and proper condiments in a damp climate like Bengal for rice-eating Prisoners.*

SIR,—I have the honor to forward my Report of the life prisoners in the Allipore Jail,* and the temporary prisoners in the Zillah Jails of the 24-Pergunnahs for the year 1847.

The Returns shew that the former who select, cook, and purchase their own victuals with an allowance of 4 pice a day from an excellent *bazar* brought daily to the Jail, have enjoyed excellent health, and that their food and employment have been congenial to that class of Indian prisoners. The annexed table (A) shews the mortality in this jail to be little more than 5 per cent.† per annum *excepting* in the years 1842 and 1843 during *the erection of several internal divisions' walls.*

* In this Jail, as will be seen by the annexed table beginning January 1836 the period when for statistical purposes the Sudder Nizamut Adawlut, at my request, allowed me to separate those *life* prisoners from the *temporary* Zillah ones, the average sickness in Hospital for ten years afterwards, was 5.01 per cent. per diem; the mortality 5.60 per cent. per annum. In this year 1836, the Magistrate officially reported to the Prison Labour Committee, the mortality had been for the previous ten years 5.25 per cent. at Allipore. The court made a favorable report of my exertions so far back as 1821, in which year the sickness was 8.33 per diem, the mortality 9.02 per cent. per annum, for the following 15 years up to 1836, the sickness was reduced to 4.70 per diem, and the mortality to 6.36 per cent. per annum, excluding Cholera mortality.

† The Prison Discipline Committee remark, page 47, in speaking of the *Allipore* Jail.—"Nine tenths of the prisoners in the Allipore Jail are confined for life, every one of these men sooner or later die in confinement—none of the convicts on the roads are confined for life, the vast majority of those therefore ought to be released *many* years before their deaths. Thus the average age of life prisoners must be ever much greater than the average age of temporary prisoners, and consequently the ratio of deaths amongst the former must ever "*cæteris paribus*" greatly exceed the ratio of deaths amongst the latter, when the contrary is the case the difference of healthfulness must be excessive."

The past year has been healthy among the inhabitants of Calcutta, as exhibited by the city mortality reports, with which I have been favored, and the annexed table framed by myself, shews the city mortality to average 5.60 per cent. per annum, including all classes for a series of 31 consecutive years.

Nevertheless, I could wish to record, that I still continue to advocate the carrying into execution the *improved continuous ceiling ventilation* ordered by Government in the Allipore Jail, and alluded to in my last report, for, in the event of great sickness taking place, at any future time, such ventilation might be of the utmost importance, and the same observations apply to the Allipore and Russah Jails, and to the Hospital.

In noticing the necessity of ceiling ventilation in the Allipore Jail, I should have referred you to my special report upon that Institution to the then Superintending Surgeon, Dr. Hough, under date the 29th of January 1844, appendaging my letters to the civil authorities. I had met Mr. Carmichael Smyth, one of the then sudder judges,* and Mr. Battye, the Superintendent, previous to this period—when on placing 100 men in one of the wards it was agreed that they appeared much too crowded; so much so, indeed, that a building was erected outside the jail to contain articles which had previously occupied an entire ward within, in order that this ward might be then occupied by convicts, and the overcrowding avoided. In my appendaged letter 8th August 1842, I remark, "Mr. Carmichael Smyth was induced to consider the overcrowding of the jail

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* This Jail having been up to a late period 1844, under the immediate superintendence of the Sudder Nizamut Adawlut, to which Court I always made direct communications. The controul of the Allipore and Zillah Jail was in that year vested in the Sessions Judge of the 24-Pergunnahs. Register's letter of Sudder Nizamut Adawlut, 11th Oct. 1844.

*Extract from the Sudder Nizamut Adawlut's letter to Government on the crowding in the Allipore Jail.*

Para. 6. On 1st October 1840 the visiting judge, Mr. Smyth, had 100 prisoners collected in one of the wards, with all their clothing, mats, &c. in order that he might ascertain from personal observation whether the wards were over-crowded or otherwise.

7th. An inspection of the ward, with its inmates, satisfied the visiting judge that the ward was not adapted to hold more than 100 to 120 prisoners with due attention to their personal comfort; and the eleven wards of the jail cannot therefore, in the opinion of the visiting judge, be considered as capable of accommodating more than 1,200 or 1,250 prisoners.

8th. The court would beg to refer the Right Honorable the Governor to the remarks contained in Mr. Batty, the superintendent's letter of the 31st ultimo, from which it would appear, that the prisoners in the Allipore jail are at present only allowed 290 cubic feet to each man, instead of 600, as has been recommended by the best authorities who have written upon that subject.

as the main cause of the then increased mortality;" at his request I met him and Mr. Battye at the jail, and we collected 100 convicts and placed them in one of the wards—both Mr. Smyth and Mr. Battye agreed that they were too much crowded—and Mr. Smyth felt more confirmed in his opinion, when I pointed out to him, on paper, that the ages of the deceased were rather *under* than over the *average* age of those who died among the Allipore life prisoners generally. (*Last month, December* 1847, *ten convicts died, the average age of each being as much as* 73 *years and a half*, whereas in the period I allude to, the average age was only 44.*) In future I shall have only aged life prisoners in this jail under my charge, the class here alluded to have been transported by Act XIV. of 1844—passed 6th July same year. I should be sorry to have the jail too much crowded. Previous to the erection of the new ward 1,452 convicts occupied cells giving 132 men per cell, the cubic measure of each contained 38,368 cubic feet of air to breath. There are now besides the ward converted into solitary cells, 12 complete wards each generally containing more or less 100 prisoners. I believe, at the period alluded to, it had been in the contemplation of Government to remove the zillah prisoners, or a part of them, into this Allipore jail, as the life prisoners were in future to be transported beyond seas, but this transportation has been in practice now for a considerable time, and yet the convicts in the jail are not so much reduced in number as might possibly have been expected. In December, 1844, the place contained 1,173 prisoners, and it has never at any time since been brought under 1,000, I have heard that it is again under question whether or not to transfer the zillah prisoners to this jail. Now though it would be much more agreeable to me to have my duties as central as this arrangement would make them, I can hardly think such a measure can conduce to general salubrity without a very considerable augmentation of the jail building. In the letter above alluded to, I recommended that *upper sleeping apartments* should be erected on the top of the present ones, that the division walls should be taken away, and that stockades should be put in their place, as advised by Mr. Battye, then superintendent. I suggested also that the bricks of these walls might answer for the proposed upper apartments, while the doors and iron

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* Average age of those who died was, in

1839,.......................... 42
1840,.......................... 43
1841,.......................... 42
1842,.......................... 44
1843,.......................... 41

window bars in the present wards would be available for the wards above, and the lower wards would make excellent working rooms, prevent the exposure of the prisoners, during work, to the heated *division* walls, and screen them from the rain. I further dwelt upon the necessity of the continuous ceiling ventilation, (since ordered by Government, under date June 25th 1845, see Under Secretary's letter,) if neither the partition walls were removed or upper dormitories erected. Should it ever occur that any considerable number of temporary zillah prisoners are to be added to those prisoners who have to eke out their existence in jail, surely the ventilation alluded to, would become doubly necessary, ventilation, however, must always, as to number and extent, bear a proportion to the degree of *crowding*, and, as we cannot tell *where* crowding may take place to the utmost extent, it would be wise at once and beforehand to provide ventilators on a scale to meet any emergency.

The Medical Board's remark in a circular of 1843, is to the point.

" Ventilation is a point of such vital importance, that every measure which can be adopted should be carried into effect, for in proportion to the purity and airiness of the wards, will be the health of the convicts. Ventilation therefore should be promoted by having ventilators in the upper part of the wards and spacious iron barred openings on the ground-floors, with an unconfined area on the outside."

The Zillah or temporary prisoners for the past year have been remarkably healthy, and the table of sickness and mortality in the Russah Jail shews a favorable comparison with those of the three preceding years, the mortality being only 3.81 and with the four Suburbs Jails included only 3.91 per cent. per annum, indicating beyond a doubt, the great advantage of the two meal per day rations, now in operation for four years. If it should be remarked that during the 26 months, including August 1839 and September 1841, long previous to the beginning of the present two meal rations, health was good and mortality small, I would respectfully bring to notice, that, the above was a period when Mr. Biscoe, at my suggestion, greatly improved the food, including in the diet, the same proportion of *animal* food now allowed, and that, when Government disallowed this food, the sickness and mortality increased considerably up to the commencement of the present system. So that although during these 26 months this improved ration was given in one meal, it was nevertheless good, and supported health accordingly. I have now every hope and expectation, if such advantages are continued, the prisoners will reap the like advantages in perhaps an even yet higher ratio as the

improvement has been *gradual*, as shewn in the annexed tables. I have added the last remark from having heard that in the reports of the civil authorities forwarding my opinions and tables upon the present ration system, it was observed, by one of those authorities, that at one period, previous to the new system, and when the prisoners had only *one* meal per day, the mortality was low, I suppose allusion was made to the period of 26 months, which I have specified. I imagine this must have been the case, but as those reports do not come under my cognizance, I cannot speak with certainty to the point. It is, however, easy to understand how persons, who have been working upon only *one* meal a day for a succession of years, (and a meal too with *hardly any animal* food), should become healthy and strong when the meal given for 26 months assimilated, almost exactly, to the improved ration that has now been distributed for four years; numerous communications transmitted to me by the Sudder Nizamut Adawlut, shewing the food *formerly* allowed to the prisoners in the neighbouring zillahs, and in which the court remark upon their *hardly ever obtaining fish*, go to confirm my opinion on the absolute necessity of a certain proportion of some animal food for men who work, and it would in my judgment be much better if those prisoners who do *not* work were also allowed some portion, (say half,) of such nourishing food.

I annex a table [abstract only of this table printed here.—Editor.] in addition to, and in continuance of my printed table of six years and eight months, and I venture here to quote the opinion of Sir James Graham shewing how strongly he coincides with myself on the subject of dieting prisoners.*

"Sir James Graham, Her Majesty's Secretary of State for the Home Department, in a letter to the Chairmen of Quarter Sessions, dated 27th January, 1843, adopts the recommendations of the Inspectors with regard to dietaries, and offers the following very proper observations:—

"I desire to call the especial attention of the magistracy to those rules which relate to the Diet of Prisoners. On the proper adjustment of this particular their health mainly depends; and I am convinced that

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* See my former letters to the Superintending Surgeons, and lengthened correspondence for several years, with the Sudder Dewanny Adawlut, when the Jails were under the superintendence of that Court.

*We may here quote an extract we have seen from the Medical Board's letter upon the state of prisoners in the 24-Pergunnah Jails as relating to Mr. Strong's suggestions:*

"*We therefore strongly urge the recommendations of the Civil Surgeon* "*to be carried into effect, as the results which he has brought forward to* "*prove that a nutritious diet did preserve the health of the prisoners in a* "remarkable *degree, appear to us to be incapable of disproof* (1843.)"—Editor.

the adoption of the proposed scales will prevent the recurrence of those complaints which have frequently been preferred, and in some instances justly preferred, against the prison authorities. It is by no means intended that the precise articles of food specified in the dietaries should be strictly adhered to in the table which you may adopt; other kinds of food, *containing an equivalent amount of nutriment*, may, with advantage, be substituted, when those articles which have been named are either difficult to be obtained in your neighbourhood, or are considered not suited to the customs and habits of the prisoners, but that quantity of food must, in all cases, be given which is sufficient, though not more than sufficient, to maintain health and strength at a moderate cost; and while due care should be exercised to prevent any approach to luxurious living in a prison, *the diet ought on no account to be made an instrument of punishment*. I have consulted not only the Prison Inspectors, but medical men of the greatest eminence, possessing the advantage of long experience; I have carefully revised the dietaries now in use, and I have come to the conclusion,—

1stly, That animal food should in all cases form part of the diet of prisoners employed at hard labour.

2ndly, That a considerable portion of the food of every prisoner should be solid; and,

3rdly, That there should be variety in the kinds of food forming the diet, and that occasional changes are necessary.

The dietaries which I now offer for your adoption are framed on these principles, and are upheld by medical science, and by the recommendation of persons on whose authority and knowledge reliance may be placed, but they have been framed without reference to the local situation of particular prisons, or to any peculiar circumstances which may render an increase necessary; they are therefore proposed as the *minimum* amount which can safely be afforded to prisoners *without the risk of inflicting a punishment not contemplated by law, and which it is unjust and cruel to inflict*; namely, loss of health and strength through the inadequacy of the food supplied."*

## Insane Hospital.

As regards the Insane Hospital, the inmates have only been removed into it from the 15th of September last, some delay in erecting the external compound wall having caused the building to remain unoccupied during the rains, and weeds collected in the two Hospitals, which, unlike the other wards

* We have seen documents which shew that Mr. Strong after having for many years advocated the allowing 4 instead of 3 pice a day to the temporary zillah prisoners, began in his Report of 1837, to place his opinion on this point upon public record, and he proved by Tables the fact of much greater mortality among these than among the life prisoners, a fact, after considerable discussion acknowledged by the Government.

The mortality among the two classes is now shown by Tables since 1836. For the 20 years' prior to that date, it is probable mortality among the life prisoners may have been more or less 5 per cent. per annum; for in that year the Magistrate reported to the Prison Discipline Committee, that the average mortality had been 5.25 per cent. per annum for the 10 *previous* years, and the tables shew a very small increase since, up to this period, among these very old convicts; that among the temporary is very much greater, and it appears that it is only since the last four years' good rations, that the great mortality among the latter has been brought down to 5 per cent. and even much less.—Ed.

and verandahs, were not covered with asphalta; in this condition, they proved to be so damp* that I feared to place the sick in them. After my representation of this, I met the present Executive Officer, and it was determined that they should be

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* They are also on *lower* ground than the other buildings. I had previously advised this ground to be raised.

See my annexed letter to the late Executive Officer. A memorandum dated as far back as the 28th March 1843.

"I think the ground on which the Hospital is built should be raised by at least 5 or 6 feet independent of the foundation, and a tank for the women, with a compound walled in, will be necessary. The Female Hospital should also be adjoining, and not near the Men's Hospital. The site of the Asylum should be as near the present excellent tank, as can well be managed, and the bank of this tank which is now unnecessarily high will help, with the mould of the new female tank and another exterior tank, to raise the ground, which is every where about here low and irregular. The draining from the tops of the building might be directed into the tanks.

I would advise good tanks, the Insanes have been used to excellent large tanks, and extensive ground at *Russa*. There were formerly wells in each compound of the *Russa zillah* Jail, close by, and all have been filled up. As regards wells for drinking water, I believe none are good any where about here, wells were lately made in the Allipore Jail, and found to fail, the water proving bad. It underwent chemical analysis by Professor O'Shaughnessy, who pronounced it to be impure. I therefore cannot recommend well water for drinking, the ground on *that* site being only just over the nullah.

Tanks will be necessary on the ground, which should be carefully levelled with a slope towards the nullah, and the Hospital drains should be made of a lasting material, and after the latest and most approved method.

The site of the ground (c) immediately north of the burying ground, might be laid out as garden ground for the Insanes to work in by day, but it *might* be questionable whether by night, the exhalations arising, and blown by the south winds so directly upon this spot, would not be injurious to health I therefore think the site marked (A) as proposed for an Insane Hospital, being nearer to the great tank and to the public road, and *west* of the Sudder Court, would prove a more appropriate spot.

I may add, that Mr. Surgeon Marshall, the Inspector of Hospitals, went over these grounds with me this morning, and his opinion is decidedly in favor of the site (A) and I should hope as all the ground belongs to Government, the present tank as well as the ground (c) may be retained as garden ground. If as much ground for work, exercise, and air, as the Insanes now enjoy, cannot be retained, Mr. Marshall would not advise the site to be removed, but should there be any objection to site (*a*) then the ground occupied by the Dog Kennel, would be better perhaps than building the Asylum immediately close to the burying ground, however the site (c) may advantageously be taken in, as garden ground, with access to the large tank, whether the Hospital be built on the site marked (*a*) or on that of the Dog Kennel.

I suggest these ideas, as the papers and plans are sent to us *that any objection or proposition should be made now, and not hereafter*, when expence shall have been incurred.

repaired and also covered with asphalta. The above officer undertakes to effect a good drainage, there being at present a deficiency in that respect. He is also about to make covered well necessaries throughout the building; for no less than three escapes have been attempted through the present awkward privies, which I condemned from the first, (see my letter to the late Executive Officer, dated January 1847 annexed,*) and a

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As regards flooring, I have always objected to Chunar stones, but as a good pucka flooring of good materials, is now proposed, I can have no objection to that. It may, however, be a question whether *Asphalta* flooring, lately adopted in Europe, may not answer for this Asylum. I have always considered a wooden flooring for Insanes to be the most fit of all

It will be proper that there should be separate cooking places for the Hindoos and the Mussulmans."

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* To Major GOODWYN, *Civil Architect, Fort William,*

*Calcutta, January* 1847.

SIR—I have the honor to acknowledge the receipt of your letter of the 12th instant, with an original letter from the Secretary Military Board at Madras, and copy of the plan of the Insane Hospital just erected here.

You request me to furnish you with any observations on the structure, or any regulations, that I may consider likely to be useful.

I return the plan, and letter of the Madras Board as requested.

As the Insanes are not as yet placed in our new Asylum, I cannot speak positively from actual experience as to its structure, but upon the whole I certainly approve of it. The wards are high and airy, and verandahs, as well as the compounds appear to be every thing that can be wished, and as you inform me in your letter of the 9th instant, that you have been particularly enjoined to make the arrangements such as I approve, viz. (the covered well privies, and surrounding wall.) I trust there will be little to find fault with when the Insanes are lodged in it. If I were to anticipate any error it perhaps may turn out that the night privies are not quite so well adapted for cleanliness and health as the covered well privies have proved to be for nearly 20 years at the old Insane Hospital, and the large Jail Hospital at Allipore. It was in 1828, I first suggested the adoption of them, and I have in my Reports stated them to have proved entirely successful.

Should, however, the privies now made not quite answer, a very small expense will make them into well covered necessaries, and the wards will then certainly be sweet, clean and healthy. It would have been highly desirable if the back grounds in which the Insanes exercise and work in the garden, had been larger, and if the Dog Kennel ground which joins our premises to the south, and which has lately been broken up can be added to the grounds of the Hospital, it will prove a great advantage to health by giving the inmates more scope for gardening and agricultural pursuits, which pursuits I have found highly amusing to convalescent Insanes, and greatly to assist other curative means. The ground is lying useless, and I am told belongs to Government, nor would it be necessary to wall it in, as the Insanes themselves can surround it with

third attempt at escape happened only a few days ago, in which two hours at least were expended in extricating an insane who had wedged himself tightly in one of the said privies, when we had first to remove the thick pucka work, and then to remove the iron nails from the metal tube, which was brought up with the man in it; he narrowly escaped with his life, but I am glad to say he is now doing well.

Some time ago, a female escaped by climbing a tree and got over into the next compound where she was secured, but on Saturday last a Hindoo man climbed very high up the tree in the left compound, on being observed he jumped down, and has been in so precarious a state that I have strongly advised the removal of the trees. You yourself had apprehensions of the insanes hanging themselves on the branches of this tree, but I think this was simply an attempt to escape. I humbly submit that trees should never be allowed within buildings intended for the security of Insanes—and as regards such privies as I have been depricating, I beg to venture an opinion that such ought never to be constructed *in* any public building. In my official letters I have represented the stench which the Physician General has witnessed with me in this new Asylum as being dreadful, and similar to that which existed in the old Insane Hospital previous to the adoption of the well covered privies which I suggested twenty years ago, (in 1828) in the old Asylum. In that year, (as will be seen in my Insane

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the aloe plant as they have surrounded the large ground in the old Insane Asylum, and the aloe fence in 3 or 4 years will be as secure as any wall. This will be the more desirable, as the grounds to the new Hospital are so much smaller than those the patients have been used to, and it would appear to involve no expence. I have for many years made statistical enquiry into the ratio of mortality among different orders of the population, and establishments in the Presidency, for general statistical purposes, and for comparison with the classes under my medical charge, and I may perhaps with propriety annex three copies of tables, I printed some time ago, in order to shew the great mortality every where among Insanes, as compared with any other class of patients, as well as to point out conspicuously the advantage of feeding prisoners sufficiently in a damp country like Bengal. I might give a detail of the kind of food that is allowed to our Insanes, but it is so very much like the morning and evening meal of the prisoners inserted in the table, that it is hardly necessary I should, the chief difference being that the Insanes have daily fish and meat in the evening with rather less rice and dâl, but then they have paun and betelnut after each meal; the least encouragement induces Insanes to work promptly, one peon has charge of eight Insanes, and there is one Naib peon to every 30 Insanes, one bhistee to 40, a dhoobee, and a barber to every 50 men, and a mehter to every 20. A Native doctor is always on the spot, and they are fed, clothed and lighted by contract at the cost of 3 rupees ahead.

Report, and as is alluded to in the 2d Report of the Municipal Committee, page 60,) I stated the mortality to have been considerably diminished during the 6 months then under consideration, it having become less than at any time for the previous twelve years,—and I attributed the advantage to such covered necessaries. I went on to report that there had been much less illness than usual, which I also attributed to the same improvement. There has been considerable illness and mortality in our new Asylum, and I cannot get rid of the opinion that the stench and bad air produced by the present necessaries have had much to do with such result, although it must be admitted that the length of time consumed in the erection of the new Asylum (keeping the insanes in the old dilapidated one,)* greatly impoverished their constitutions, and they were consequently brought in a deplorably weak state into the Asylum they now inhabit. I have no doubt but that the plan of covered well necessaries, now about to be adopted, will render the whole building sweet, clean, and healthy. Cooking rooms for the servants, as recommended by the Physician General, are about to be erected outside the Asylum, and then I believe every thing will have been accomplished that may be deemed generally conducive to salubrity.

Some further remarks with reference to the printed tables appear proper. Up to the year 1836, the sick return of the life and

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* See extract from my Report for the years 1841 and 1842, annexed.

*Report* 1841.—"In my last year's return, I made the following remarks: "Both this and last year, there has been a considerable increase in the "number of Insanes, as will be seen by the table of 25 years annexed. "The Asylum after long correspondence has been white washed, but the "drains, and the well necessaries, are not put in order, the reason I trust "is that Government are about to erect a new building. I annex a letter "to the Civil Engineer upon this subject. And am of opinion that the "ground behind the Sudder Nizamut Adawlut, although at present "*rather low*, and its surface irregular, yet if levelled and raised a little, "would be an excellent site for a new Hospital."

*Report* 1842.—"I beg now to observe that the filthy state of the "Insane Hospital and insufficiency of the repairs, has in my opinion "within the last two years prevented my keeping down the number of "Insanes so low, as I had been able to do for the previous 20 years, they "have consequently been more crowded, and from the defaced, and "broken condition of the ground floors, (which I have constantly pointed "out since the year 1832,) it has been impossible to keep the wards and "verandahs sweet and clean; these circumstances have united to "prevent the recovery of many, who I concientiously believe would "have otherwise been recovered and restored to their friends, that is, "under more cleanly and advantageous circumstances, and it will be "seen that the yearly *expence of Government has likewise increased.*"

temporary prisoners was made in one report, but it is ascertained that for the last 20 years, as I have before observed, the mortality among the Allipore life prisoners has not been very much more than 5 per cent. per annum, which makes the mortality among the zillah prisoners approximate to that of the 19 neighbouring zillahs, for up to the period of the present improved rations, it must have been about 7 per cent. or more, which, considering they were younger and temporary is an extraordinary mortality over our life prisoners, who, the Prison Discipline Committee pronounce to be peculiarly healthy, and yet our zillah mortality does not exceed the average of the 19 zillah stations around us, which, in calculations, of numerous years, and *different* years, average upwards of 8 per cent. per annum; I hope, however, it will be found that, for the last four years (during which time they have all enjoyed 2 cooked rations daily) their mortality has been equally reduced with the 24-Pergunnahs' zillah prisoners under my charge. In the six years 1833 to 1838 inclusive, the general mortality in the Bengal adjoining districts was found to be 8.38 per cent. per annum, another calculation of eleven years begining 1833 to 43 inclusive, it is 8.44 per cent. Mr. Hutchinson's work, page 105, makes the average for four years 8.33, and in page 215 he makes the mortality in the Lower Provinces, including the Dinapore Division, as much as 9.28 per cent. for the year 1843, the last year before the present improved system. These facts I alluded to in my last report, in which I mentioned that the necessaries in the zillah jail were still very deficient, and that Dr. Panton's improved ventilation had not been adopted. It is to be considered that we have four other jails in the suburbs, which although, formerly, dreadfully unhealthy, have within the last four years been, as I predicted, peculiarly healthy even more so than those of the zillah Russah jail, as will be seen by the lower line marked in the abstract table for illustration. It speaks forcibly in favor of the late rations, and every one of the inmates are men working on the roads, perhaps the healthiest work for prisoners, if well fed. Among the *entire* zillah prisoners the last four columns representing the four periods for the last four years, shew less sickness, as well as less mortality, than even the improved state of the prisoners in the Russah zillah jail containing men of *various kinds, but who do not partake of any animal food*, with the exception of a few working prisoners. In the former printed table I had not given the lower line shewing the detail of the *entire zillah prisoners*, lest it should have confused the zillah jail detail, which was given on a plan advised long ago by the Medical Board.

My attention was, I confess, first drawn particularly to this important subject, by the scrutinizing circular (No. 598,) of the Medical Board, December 1833, on the extraordinary mortality of prisoners as compared with sepoys.

To G. LAMB, ESQ.,
*Inspector Genl. of Hospitals, Presy. Divn.*

*31st January* 1848.

I have, &c.,
F. P. STRONG,
*Surgeon*, 24-*Purgunnahs.*

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TABLE A.

*Sickness and Mortality of the Allipore Jail (at the Presidency) containing Prisoners for life who are allowed 4 pice per diem for food. They work within the walls of the jail.*

| | | | |
|---|---|---|---|
| 1837,... | Average | daily number of Prisoners, .. ............... | 1,201 |
| | „ | sick per cent. per diem, ......... ........... | 3.36 |
| | „ | death per cent. per annum, .................. | 4.57 |
| 1838,... | „ | number of Prisoners, ............... ........ | 1,320 |
| | „ | sick per cent. per diem, .................... | 3.28 |
| | „ | death per cent. per annum,...... .......... | 5.37 |
| 1839,... | „ | number of Prisoners, ....................... | 1,417 |
| | „ | sick per cent. per diem, ..................... | 3.70 |
| | „ | death per cent. per annum,................... | 5.50 |
| 1840,... | „ | number of Prisoners, ....................... | 1,507 |
| | „ | sick per cent. per diem, ..................... | 4.67 |
| | „ | death per cent. per annum, ................. | 5.37 |
| 1841,... | „ | number of Prisoners, ....................... | 1,425 |
| | „ | sick per cent. per diem, ..................... | 5.06 |
| | „ | death per cent. per annum,................... | 4.98 |
| 1842,... | „ | number of Prisoners,. ....................... | 1,446 |
| | „ | sick per cent. per diem, ..................... | 4.95 |
| | „ | death per cent. per annum, ........ ......... | 8.57 |
| 1843.... | „ | number of Prisoners, ....................... | 1,357 |
| | „ | sick per cent. per diem, ..................... | 7.06 |
| | „ | death per cent. per annum, .................. | 9.80 |
| 1844,... | „ | number of Prisoners, ....................... | 1,275 |
| | „ | sick per cent. per diem, ..................... | 6.02 |
| | „ | death per cent. per annum,................... | 5.72 |
| 1845,... | „ | number of Prisoners, ....................... | 1,192 |
| | „ | sick per cent. per diem, ..................... | 5.93 |
| | „ | death per cent. per annum,..... ............ | 4.19 |
| 1846,... | „ | number of Prisoners, ....................... | 1,164 |
| | „ | sick per cent. per diem, ..................... | 6.24 |
| | „ | death per cent. per annum,................... | 4.12 |
| 1847,... | „ | number of Prisoners, ....................... | 1,066 |
| | „ | sick per cent per diem, ...... .............. | 6.35 |
| | „ | death per cent. per annum,............... .. | 4.03 |

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„ For ten years, sick 5.01 per cent. per diem.
„ For ten years, mortality 5.60 per cent. per annum.
„ For ten years, *previous* to 1837 the mortality was 5.2

## Table B.

***Return shewing the number of Convicts confined in the Russa Jail, and in the different Suburb Jails, also the Up-Country, and Bengal Prisoners, working on the roads, their sickness and mortality, from the commencement of the Ration System.***

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*First*, 15 *Months, from May* 1838 *to July* 1839.

Ration system commenced instead of three pice. (Insufficient ration.)
Average in different jails 805 daily.
Sick per diem 10 per cent.
Deaths per cent. per annum 7.95.

*Second*, 26 *Months, from August* 1839 *to September* 1841.

Mr. Biscoe's improved ration, animal food every other day.
Average in different Jails, 665 daily.
Sick per diem or 7.69 per cent.
Deaths per cent. per annum 4.30.

*Third*, 15 *Months, from October* 1841 *to December* 1842.

Return to the former ration. (Insufficient.)
Average in different Jails, 737 daily.
Sick per diem, or 10.26 per cent.
Deaths per cent. per annum 9.44.

*Fourth*, 12 *Months, for* 1843.

Ration with trifling improvement. (But insufficient.)
Average in different Jails, 850 daily.
Sick per diem, 10.0 per cent.
Deaths per cent. per annum 7.71.

*Fifth*, 12 *Months, for* 1844.

Present good ration, see Diet Table.
Average in different Jails, 903 daily.
Sick per diem, 8.89 per cent.
Deaths per cent. per annum 5.65.

*Sixth*, 12 *Months, for* 1845.

Present good ration.
Average in different Jails, 816 daily.
Sick per diem, 8.13 per cent.
Deaths per cent. per annum 4.76.

*Seventh*, 12 *Months, for* 1846.

Present good ration
Average in different Jails, 699 daily.
Sick per diem, or 8.56 per cent.
Deaths per cent. per annum 3.16.

*Eighth*, 12 *Months, for* 1847.

Present good ration.
Average in different Jails, 673 daily.
Sick per diem, or 6.35 per cent.
Deaths per cent. per annum, 3.91.

***DIET TABLE.—Exhibiting the quantity and variety of Food, which are necessary in the opinion of the Medical Board for the Preservation of the health of Labouring and Non-Labouring Convicts in Jail***

| | Non-Labouring Convicts. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Morning Meal. | | | | | | | Evening Meal. | | | | | | | | |
| | Rice. | Dall. | Vegetables. | Ghee. | Salt. | Mussalah per Diem. | Total of each. | Rice. | Dall. | Vegetables. | Fish or Flesh. | Ghee. | Salt. | Mussalah per Diem. | Total of each. | Grand total daily Food. |
| | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. |
| Same Daily,* ........ ... | 10 | 2 | — | ½ | ½ | ½ | 13½ | 12 | 4 | 2 | — | ½ | ½ | ½ | 19½ | 33 |
| | **Working Convicts.** | | | | | | | | | | | | | | | |
| | Morning Meal. | | | | | | | Evening Meal. | | | | | | | | |
| | Rice. | Dall. | Vegetables. | Ghee. | Salt. | Mussalah per Diem. | Total of each. | Rice. | Dall. | Vegetables. | Fish or Flesh. | Ghee. | Salt. | Mussalah per Diem. | Total of each. | Grand total daily Food. |
| | Oz. | Oz. | Oz. | Oz | Oz. | Oz. | Oz. | Oz | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. | Oz. |
| Monday,† .................. | 10 | 4 | — | ½ | ½ | ½ | 15 | 16 | — | 4 | 8 | ½ | ½ | ½ | 29¾ | 45 |
| Tuesday, .................. | 10 | 4 | — | ½ | ½ | ½ | 15½ | 18 | 6 | 4 | — | ½ | ½ | ½ | 29½ | 45 |

* Every day the above quantity the same.

† The above change on alternate days of the week except on Sundays, when the Labouring Convicts will receive the same as the Non-Labouring Convicts. Up-Country prisoners should be allowed Wheat Flour instead of Rice. A small quantity of Tobaco should be allowed. One and half Seer of Fire-wood should the cooks require it.

## Table C. Abstract of Voluminous Figured Tables.

***Table showing the Sickness and Mortality, first, of the Zillah Jail of the 24-Pergunnahs and in the bottom line that of all the four Suburb Jails including the Zillah Jail, beginning from May 1838, the commencement of the Ration System.***

| Daily average Sickness in Hospital. | First 15 Months. Bad food. | Second 26 Months. Good food. | Third 15 Months. Bad food. | Fourth 12 Months. Bad food. | Fifth 12 Months. Good food. | Sixth 12 Months. Good food. | Seventh 12 Months. Good food. | Eighth 12 Months. Good food. |
|---|---|---|---|---|---|---|---|---|
| Labouring, ............ one in | 6½ | 11½ | 8⅓ | 10 | 5⅛ | 4¼ | 4¾ | 5½ |
| Non-Labouring, ......... ditto | 36½ | 161½ | 32⅓ | 73½ | 30¾ | 14¼ | 14¾ | 7½ |
| Hindoos, .................. ditto | 11 | 17¾ | 11 1/10 | 13½ | 6¼ | 5¾ | 6½ | 6⅓ |
| Mussulmans, ........... ditto | 11 | 19¼ | 11⅓ | 19 | 5¾ | 5¾ | 5 | 6¼ |
| Untried, ................... ditto | 6¾ | 20½ | 9¾ | 46 | 17¾ | 11½ | 10¼ | 9¼ |
| Debtors, .................. ditto | 74 | 77⅛ | 69 | 153 | 56 | 58 | 21¾ | 33½ |
| Females, ... ............. ditto | 5¼ | 9⅜ | 8 | 10 | 6½ | 5¾ | 5 | 3¾ |
| Total, in Zillah Jail one to... | 11⅛ | 19 | 11⅓ | 16 | 6¾ | 5¼ | 5¾ | 6¼ |
| All the Convicts of 4 Suburb Jails *and* Zillah Jail, ...... | 18 | 13 | 9¾ | 10 | 11¼ | 11½ | 12 | 16¾ |

| Mortality, per Cent. per Annum. | First 15 Months. Bad* food. | Second 26 Months. Good food. | Third 15 Months. Bad food. | Fourth 12 Months. Bad food. | Fifth 12 Months. Good food. | Sixth 12 Months. Good food. | Seventh 12 Months. Good food. | Eighth 12 Months. Good food. |
|---|---|---|---|---|---|---|---|---|
| Labouring, ...................... | 9 . 23 | 4 . 71 | 11 . 17 | 9 . 56 | 6 . 44 | 7 . 62 | 4 . 68 | 5 . 44 |
| Non-Labouring, ............... | 0. 0 | 0 . 30 | 0. 0 | 2 . 73 | 5 . 06 | 6 . 41 | 0. 0 | 0. 0 |
| Hindoos, ........................ | 6 . 40 | 3 . 81 | 10 . 45 | 8 . 08 | 7 . 09 | 8 . 56 | 5 . 74 | 3 . 18 |
| Mussulmans, ................. | 4. 0 | 2 . 41 | 7 . 09 | 8. 0 | 4 . 31 | 2 . 56 | 0 . 70 | 4 . 94 |
| Untried, ......................... | 26 . 27 | 8 . 39 | 48. 0 | 8 . 45 | 3 . 33 | 5 . 46 | 1 . 85 | 0. 0 |
| Debtors, ........................ | 0 . 89 | 2 . 46 | 4. 0 | 1 . 95 | 5 . 88 | 6 . 82 | 2 . 90 | 3 . 57 |
| Females, ........................ | 0. 0 | 2 . 67 | 4. 0 | 2 . 51 | 5 . 13 | 9 . 30 | 0. 0 | 1 . 93 |
| Total, in Zillah Jail, ......... | 5 . 42 | 3 . 25 | 7 . 84 | 8 . 07 | 6 . 22 | 6 . 28 | 4 . 53 | 3 . 81 |
| All the Convicts of 4 Suburb Jails *and* Zillah Jail, ...... | 7 . 95 | 4 . 30 | 9 . 44 | 7 . 71 | 5 . 65 | 4 . 76 | 3 . 16 | 3 . 91 |

* I use the terms bad and good food deferentially, and to express my professional opinion. I appeal to results.

**Table D.** *Comparative Table of Mortality under different systems of Dieting the temporary Prisoners of the Zillah Jail, 24-Pur-gunnahs and four minor Jails in Suburbs of Calcutta.*

Commencement of Contractors 3 pice Ration the beginning of the year 1838, consisting of Rice 1¼℔ (10 chattacks), pulse (dâl) 3 oz., Oil ½ oz., Salt ½ oz. Tobacco ½ oz. in one meal at sunset. This with a handful of parched pulse and rice called "*julpun,*" at luncheon time, is all the food they got in 24 hours.

| Year | Month | Remarks | *No. of Prisoners.* | *Deaths.* |
|---|---|---|---|---|
| 1838 | May, ...... | But for May, June, and July some fish, ghee, spices and vegetables were added and in suitable quantity, with the effect of allaying the complaints and tumult among the prisoners | 826 | 8 |
| | June, ...... | | 894 | 5 |
| | July, ...... | | 900 | 3 |
| | August, ... | And in August given up and the insufficient Ration again given. | 849 | 4 |
| | September, | | 875 | 2 |
| | October, ...... | ... ... ... ... ... | 806 | 6 |
| | November, ... | ... ... ... ... ... | 793 | 6 |
| | December, ... | ... ... ... ... ... | 789 | 10 |
| 1839 | January,...... | ... ... ... ... ... | 866 | 6 |
| | February, ... | ... ... ... ... ... | 893 | 7 |
| | March, ...... | ... ... ... ... ... | 792 | 2 |
| | April, ......... | ... ... ... ... ... | 721 | 3 |
| | May, ......... | ... ... ... ... ... | 753 | 6 |
| | June, ......... | ... ... ... ... ... | 642 | 9 |
| | July, ......... | ... ... ... ... ... | 673 | 3 |

Mr Strong's Ration adopted for 26 months, viz. from August 1839 to September 1841 inclusive; vide next table.

| Year | Month | Remarks | No. of Prisoners | Deaths |
|---|---|---|---|---|
| 1841 | October, ... | Insufficient Ration again ordered by Government. | 713 | 5 |
| | November, | | 715 | 4 |
| | December, ... | ... ... ... ... ... | 713 | 6 |
| | January,...... | ... ... ... ... ... | 793 | 9 |
| | February, ... | ... ... ... ... ... | 711 | 6 |
| | March, ...... | ... ... ... ... ... | 709 | 6 |
| | April, ......... | ... ... ... ... ... | 733 | 6 |
| | May, ......... | ... ... ... ... ... | 811 | 6 |
| | June, ......... | ... ... ... ... ... | 801 | 3 |
| | July, ......... | ... ... ... ... ... | 714 | 4 |
| | August, ...... | ... ... ... ... ... | 728 | 1 |
| | September,... | ... ... ... ... ... | 719 | 3 |
| | October, ...... | ... ... ... ... ... | 724 | 10 |
| | November,... | ... ... ... ... ... | 735 | 9 |
| | December, ... | ... ... ... ... ... | 741 | 9 |
| 1843 | January,...... | ... ... ... ... ... | 699 | 10 |
| | February, ... | ... ... ... ... ... | 788 | 3 |
| | March, ...... | ... ... ... ... ... | 811 | 3 |
| | April, ......... | ... ... ... ... ... | 790 | 4 |
| | May, ......... | ... ... ... ... ... | 860 | 2 |
| | June, ......... | ... ... ... ... ... | 919 | 4 |
| | July, ......... | ... ... ... ... ... | 842 | 5 |
| | August, ...... | ... ... ... ... ... | 879 | 6 |
| | September,... | ... ... ... ... ... | 831 | 7 |
| | October, ...... | ... ... ... ... ... | 829 | 6 |
| | November,... | ... ... ... ... ... | 778 | 4 |
| | December, ... | Making a total of 42 months, . | 779 | 9 |
| | | **Death per Cent. per annum under the Ration objected to, 3.38** | 32937 | 320 |

*Table shewing the great lessening of mortality by the adoption of adequate and nutritious food among the same prisoners. Mr. Strong's Ration, as follows, was given in one meal; he not having as yet obtained permission to give it in two, as has been since sanctioned.*

Rice daily 1¼ lb., vegetables ditto 4 oz., spices ditto ½ oz., Salt ditto ½ oz., Tobacco ditto ½ oz. Every other day, pulse (dâl) 8 oz., alternate days Fish or Meat 8 oz.; Ghee 1 oz. every other day with oil 1 oz., on the alternate days. Actual cost 4 pice.

| | | | *No. of Prisoners.* | *Deaths.* |
|---|---|---|---|---|
| 1839 | August, ... | Mr. Strong's good Ration in one meal. ... | 713 | 1 |
| | September,... | ... ... ... ... ... | 429 | 3 |
| | October, ...... | ... ... ... ... ... | 703 | 3 |
| | November,... | ... ... ... ... ... | 698 | 5 |
| | December, ... | ... ... ... ... ... | 581 | 2 |
| 1840 | January,...... | ... ... ... ... ... | 591 | 3 |
| | February, ... | ... ... ... ... ... | 613 | 2 |
| | March, ...... | ... ... ... ... ... | 591 | 0 |
| | April, ......... | ... ... ... ... ... | 617 | 4 |
| | May, ........ | ... ... ... ... ... | 694 | 5 |
| | June, ......... | ... ... ... ... ... | 676 | 0 |
| | July, ......... | ... ... ... ... ... | 683 | 3 |
| | August, ...... | ... ... ... ... ... | 643 | 3 |
| | September,... | ... ... ... ... ... | 589 | 0 |
| | October, ...... | ... ... ... ... ... | 513 | 0 |
| | November, ... | ... ... ... ... ... | 535 | 1 |
| | December, ... | ... ... ... ... ... | 587 | 3 |
| 1841 | January,...... | ... ... ... ... ... | 699 | 2 |
| | February, ... | ... ... ... ... ... | 697 | 4 |
| | March, ...... | ... ... ... ... ... | 652 | 3 |
| | April, ......... | ... ... ... ... ... | 792 | 2 |
| | May, ......... | ... ... ... ... ... | 697 | 3 |
| | June, ......... | ... ... ... ... ... | 786 | 1 |
| | July, ......... | ... ... ... ... ... | 798 | 1 |
| | August, ...... | ... ... ... ... ... | 713 | 1 |
| | September,... | Total 26 months, ... ... | 719 | 3 |
| 1844 | January, ... | The present 2 meal per day Ration commenced, similar to the above, see Diet table. | 798 | 7 |
| | February, ... | | 851 | 1 |
| | March,......... | ... ... ... ... ... | 801 | 10 |
| | April, ......... | ... ... ... ... ... | 1056 | 8 |
| | May, ......... | ... ... ... ... ... | 951 | 4 |
| | June, ......... | ... ... ... ... ... | 982 | 2 |
| | July, ........ | ... ... ... ... ... | 982 | 4 |
| | August, ...... | ... ... ... ... ... | 878 | 1 |
| | September,... | ... ... ... ... ... | 865 | 2 |
| | October, ...... | ... ... ... ... ... | 896 | 4 |
| | November, ... | ... ... ... ... ... | 915 | 3 |
| | December, ... | ... ... ... ... ... | 852 | 5 |

| | | *No. of Prisoners.* | *Deaths.* |
|---|---|---|---|
| 1845 | January, ...... | 821 | 4 |
| | February, ... | 906 | 4 |
| | March,......... | 834 | 8 |
| | April, ......... | 852 | 1 |
| | May, ......... | 877 | 3 |
| | June, ......... | 894 | 1 |
| | July, ......... | 911 | 2 |
| | August, ...... | 887 | 3 |
| | September,... | 950 | 3 |
| | October, ...... | 954 | 3 |
| | November, ... | 857 | 6 |
| | December, ... | 839 | 4 |
| 1846 | January,...... | 836 | 2 |
| | February, ... | 743 | 3 |
| | March, ...... | 716 | 1 |
| | April, ......... | 732 | 2 |
| | May, ......... | 758 | 6 |
| | June, ......... | 757 | 1 |
| | July, ......... | 759 | 2 |
| | August, ...... | 759 | 0 |
| | September,... | 768 | 1 |
| | October,...... | 766 | 1 |
| | November,... | 763 | 2 |
| | December,... | 751 | 3 |
| 1847 | January,...... | 727 | 1 |
| | February, .. | 730 | 4 |
| | March, ...... | 753 | 1 |
| | April, ......... | 743 | 2 |
| | May, ......... | 740 | 1 |
| | June, ......... | 710 | 2 |
| | July, ......... | 721 | 2 |
| | August, ...... | 723 | 0 |
| | September,... | 716 | 6 |
| | October,...... | 667 | 2 |
| | November,... | 665 | 2 |
| | December,... | 686 | 5 |
| | | 56405 | 207 |

**Death per Cent. per Annum under the improved Ration, 4.40**

## Table II.

*Table shewing the advantage of Exercise to Insane Patients, and the number of cures and discharges produced thereby, as also the saving effected in the Bengal Presidency Native Insane Hospital, at Russa, in the 24-Pergunnahs, during 27 years, commencing* 1821.

| Years. | Number of Patients at the end of each year. | Number of Admissions. | Annual Expense. |
|---|---|---|---|
| 1816 | 186 | 122 | 18103 |
| 1817 | 170 | 115 | 17346 |
| 1818 | 168 | 85 | 15929 |
| 1819 | 155 | 80 | 12724 |
| 1820 | 174 | 109 | 13370 |
| Total,... | 853 | 511 | 77472 |
| 1821 | 155 | 99 | 11912 |
| 1822 | 135 | 108 | 10684 |
| 1823 | 112 | 88 | 7530 |
| 1824 | 102 | 127 | 7935 |
| 1825 | 106 | 94 | 6929 |
| Total,... | 610 | 516 | 44990 |
| 1826 | 105 | 99 | 7172 |
| 1827 | 109 | 100 | 7478 |
| 1828 | 109 | 132 | 8180 |
| 1829 | 149 | 134 | 8435 |
| 1830 | 143 | 129 | 8543 |
| Total,... | 615 | 594 | 39808 |
| 1831 | 120 | 143 | 8734 |
| 1832 | 121 | 116 | 7042 |
| 1833 | 121 | 158 | 8064 |
| 1834 | 125 | 146 | 8011 |
| 1835 | 137 | 126 | 7586 |
| Total,... | 624 | 689 | 39437 |
| 1836 | 116 | 144 | 7929 |
| 1837 | 144 | 116 | 8057 |
| 1838 | 133 | 132 | 8554 |
| 1839 | 133 | 130 | 8183 |
| 1840 | 150 | 125 | 8902 |
| Total,... | 676 | 647 | 41625 |

### No. 1.

*Comparative Statement of Expense.*

It appears, from the above Statement, that for the 5 years ending 1820, 853 Insane Patients cost Government,................................Rs. 77472

This for the next 27 years ensuing would, at the same rate, amount to Patients 4606, and cost to Government, ............................. 418331

Whereas, it will appear that during the latter period, with increased admissions, to the extent of 32 per annum, the number of Patients actually maintained was only 3744, and the cost to Government, ........................... 236883

Saving,.......................... 862 ...... 181448

Note.—This Saving consisted as follows:

In regulating the Contract System and Management, ............................................. 103159

In the decrease of Patients by retaining only bad Cases, and disposing of the manageable ones among relatives, connections, &c., ......... 78289

Saving, ............................................. 181448

### Or, No. 2.

If the Hospital receive full credit for its proper selection of Patients, and the Saving thence be made to rest on the admissions alone between the two periods, it will be still more; as follows:

511 Admissions during the first 5 years, having cost Rs. 77472 the 3635 admissions during the last 27 years, would, at this rate, cost, 551097

Deduct actual cost, .................... 236883

Saving, ............................ 314214

### No. 3.

The average annual expense of the 5 years ending in 1820, amounted to, ...................... 1549

And for the 27 years ending in 1847 to ...... 877

Annual Saving, ........................ 672

Ditto for 27 years, ..................... 18144

*Table shewing the advantage of Exercise to Insane Patients, &c.—Continued.*

| Years. | Number of Patients at the end of each year. | Number of Admissions. | Annual Expense. |
|---|---|---|---|
| 1841 | 159 | 130 | 9354 |
| 1842 | 159 | 134 | 9641 |
| 1843 | 155 | 136 | 9502 |
| 1844 | 163 | 132 | 9738 |
| 1845 | 180 | 178 | 10063 |
| 1846 | 201 | 218 | 10943 |
| 1847 | 202 | 261 | 11782 |
| Total,... | 1219 | 1189 | 71023 |
| Total for 27 years, | 3744 | 3635 | 236883 |

To shew that this decrease of expenditure did not arise from a smaller number of admissions, the average of the 5 years ending in 1820 was $102\frac{1}{4}$

And for the 27 years ending in 1847, ......... $134\frac{1}{2}$

Making an annual increase for the last 27 years of ........................................... $32\frac{1}{4}$

While the average number for the first 5 years in the Hospital was ......................... $170\frac{3}{4}$

And for the last 27 years it has been only,... $138\frac{3}{4}$

**Note.**—By Nos. 1 and 3, the Saving is, . Rs. 181448
By No. 2 the Saving would be, ...... 314214

The employment and amusement of the convalescent Insanes have been various. When the floors became so damp, from age, that the Insanes could not lie upon them, they constructed raised platforms or *mutchans* of bamboo for beds, themselves. Singing, dancing, cards, (not gambling) the drum, flute, &c. have been encouraged. Some women have spun, some have made cloth, picked coffee, rice, &c and the Insane men who exercise in the open air have, for many years, been constantly sowing, transplanting, and rearing coffee, a quantity of which was packed up and sent by the Ship *Warrior* to the Honorable the Court of Directors in 1832, and some to the Royal Asiatic Society, and was highly approved by the London Brokers. Every description of Gardening has been adopted by those willing to work, and this activity has been, I really believe, the chief means of curing and discharging many.

When Lord William Bentinck, at my suggestion, procured American Cotton Seed for trial in this country, the Sea Island and Upland Georgia Plants were grown by them, and these Insanes were among the first to produce this Cotton.

Large quantities of the Otabeite Sugar Cane have been produced by their labour, and this, as well as the Cotton, and Coffee, I have sent from the Insane Hospital Garden to various parts of India. They have extensively reared the Cactus Plant, and produced the Insect (Cochineal), which, with the Coffee, &c., has been highly approved by the India Agricultural Society, and their opinions published in their Transactions. They have successfully grown the Spanish Arnato, the Sapan Wood of commerce, the Mulberry Plants and the Cassido, which produces Tapioca, *since* become an article of commerce here, and latterly they have cultivated the Aloe, and from the fibre of this plant, Rope of extraordinary strength has been made.

## TABLE E.

*Comparative Table of Mortality among Insane Patients, wherever it can be ascertained.*

The Editor of the Lancet states, page 223 for 1838-9, that " Insanity is one of the most fatal diseases to which the human race is liable. This result is not deduced from the experience of a few Asylums, but from nearly all the observations on record, whether made *in England, Scotland, France or America.*"

| | Cases Treated. | No. Died. | Deaths per Cent. | |
|---|---|---|---|---|
| It is now ascertained (1842) that in Wales, there are 1000 Insanes, but there is no Insane Asylum in the whole country. | | | | |
| *England Scotland, France and America,* ............... | 18185 | 4793 | 26.35 | Statistics of English Lunatic Asylums. |
| Cork Lunatic Asylum, 1834-8, ..................... | 750 | 221 | 29. 0 | Sherwood Lunatic Asylum, Parliamentary Returns. |
| Ten Distinct Asylums, 1837, | 788 | 165 | 21. 0 | Ditto do., Lancet, page 234. |
| Clarenton, Paris, ............ | 1557 | 546 | 35. 6 | Lancet, 1838-9, p. 349. |
| Lancaster, ........... ......... | 1750 | 577 | 32.97 | Pritchard, p. 143, |
| Hanwell, for 5 years, ...... | ...... | ...... | 27. 5 | Lancet, 1838-9, p. 412. |
| Sunavra, Italy, ............... | ...... | ...... | 42.50 | Lancet, 1836-7, p. 544. |
| English Country Asylums, | ...... | ...... | 28. 0 | Lancet, 1838-9, p. 233. |
| Irish Asylums, .............. | ...... | ...... | 28. 0 | Lunatic Asylums *Ireland*, Parliamentary Returns, 27th April, 1838. |
| York Retreat, .............. | ...... | .... | 20. 0 | Lancet, 1836-7, p. 544. |
| Wakefield, .................. | ...... | ...... | 24. 0 | Lancet, 1836-7, p. 544. |
| Cork, ......... .............. | ...... | ...... | 30. 0 | Ditto. |
| French Hospitals in General, ....... ... .............. | ...... | ...... | 22. 0 | Ditto. |
| Lancaster, ....... ............ | ...... | ...... | 24. 5 | Ditto. |
| Clarenton, .................... | ...... | ...... | 25. 0 | Ditto. |
| Petersburg, (1 year, 1835,) | 130 | 24 | 18.46 | See Russia and the Russian p. 314. |
| Paris, Saltpetriere, (10 years) ...................... | 2804 | 790 | 28.10 | Monsr. Esquirol's Table ar Report. |
| St Luke's and Bethlem, (Males), .................. | 4417 | 774 | 17. 0 | Lancet, 1838-9, p. 235. |
| London Middlesex Lunatic Asylum, (10 years ending in 1840), ........ . .......... | 2029 | 656 | 32.33 | See Dr. Copeland's Diction ry on Insanity, p. 494, 18- Dr. Conolly's Report for 18- |
| Calcutta, (10 years, 1833-1842,) .............. | 2685 | 454 | 16.90 | Presidency Native Insa Asylum. |
| Calcutta, 5 years, 1843-1847, | 1826 | 316 | 17.30 | |

At Bethlem and St. Luke's Lunatics are generally kept *twelve months only*, and th in a dangerous state are not admitted: when dangerous symptoms supervene they discharged forthwith, and hurried out of the precincts of the Hospital, lest high mor lity should bring the Establishment into bad odour.

N. B.—At the Calcutta Asylum, there can be no reservation of this nature, ca however desperate, must be admitted, and of course this will tell against the per centa

## TABLE M.

*Mortality among all Classes in Calcutta, as far as ascertainable, for 31 years.*

| Years. | Protestant. | Presbyterian. | Catholic Burials D'Rozario. | Catholic Burials Boitakhanah. | Greeks. | Armenians. | Indo-Armenians. | Native Christians. | Mahomedans. | Hindoos. | Total. | General Average excluding Greeks and Native Christians of whom there is no Census. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1817 | 216 | Scotch Cemetry not formed. | 313 | 169 | 4 | 10 | 3 | No returns. | No returns. | No returns. | 711 | Average for 15 years at 6 per cent. per annum excluding Natives of whom there were no returns. |
| 1818 | 272 | | 211 | 159 | 2 | 20 | 3 | | | | 665 | |
| 1819 | 275 | | 284 | 158 | 0 | 23 | 3 | | | | 743 | |
| 1820 | 281 | | 282 | 136 | 0 | 17 | 1 | | | | 717 | |
| 1821 | 246 | | 277 | 172 | 0 | 16 | 3 | | | | 714 | |
| 1822 | 324 | | 294 | 140 | 0 | 16 | 2 | | | | 776 | |
| 1823 | 270 | | 277 | 156 | 0 | 10 | 2 | | | | 715 | |
| 1824 | 278 | | 282 | 188 | 0 | 21 | 1 | | | | 750 | |
| 1825 | 297 | | 285 | 154 | 1 | 12 | 10 | | | | 758 | |
| 1826 | 275 | | 309 | 145 | 2 | 19 | 17 | | | | 765 | |
| 1827 | 254 | 11 | 308 | 174 | 0 | 15 | 16 | 4 | | | 778 | |
| 1828 | 256 | 19 | 250 | 170 | 2 | 15 | 12 | 3 | | | 722 | |
| 1829 | 184 | 21 | 209 | 146 | 3 | 12 | 16 | 2 | | | 588 | |
| 1830 | 224 | 26 | 236 | 138 | 1 | 14 | 15 | 0 | | | 653 | |
| 1831 | 186 | 29 | 236 | 122 | 3 | 17 | 19 | 8 | | | 609 | |
| 1832 | 217 | 25 | 269 | 121 | 1 | 17 | 16 | 1 | 1009 | 8291 | 9973 | All classes for 16 years at 5.69 per cent. per annum. |
| 1833 | 302 | 30 | 288 | 204 | 2 | 23 | 14 | 5 | 2385 | 15138 | 18384 | |
| 1834 | 281 | 35 | 257 | 199 | 2 | 16 | 17 | 4 | 1900 | 11167 | 13872 | |
| 1835 | 233 | 18 | 233 | 115 | 1 | 7 | 16 | 4 | 1229 | 6873 | 8724 | |
| 1836 | 197 | 26 | 188 | 104 | 0 | 15 | 13 | 3 | 1515 | 6366 | 8424 | |
| 1837 | 190 | 31 | 261 | 102 | No returns. | 23 | 7 | No returns. | 1367 | 7097 | 9078 | |
| 1838 | 209 | 33 | 266 | 123 | | 15 | 14 | | 1514 | 9802 | 11976 | |
| 1839 | 182 | 36 | 235 | 74 | | 16 | 9 | | 1405 | 6570 | 8527 | |
| 1840 | 262 | 70 | 191 | 97 | | 14 | 13 | | 2703 | 9027 | 12377 | |
| 1841 | 314 | 57 | 249 | 137 | | 25 | 22 | | 3588 | 8667 | 13059 | |
| 1842 | 345 | 80 | 249 | 118 | | 22 | 18 | | 4156 | 9955 | 14943 | |
| 1843 | 277 | 64 | 201 | 102 | | 19 | 14 | | 3365 | 7381 | 11423 | |
| 1844 | 344 | 45 | 334 | 125 | | 18 | 19 | | 5043 | 10580 | 16508 | |
| 1845 | 365 | 42 | 229 | 103 | | 26 | 19 | | 4148 | 9038 | 13970 | |
| 1846 | 371 | 87 | 273 | 107 | | 19 | 12 | | 4583 | 9100 | 14552 | |
| 1847 | 262 | 95 | 225 | 64 | | 16 | 8 | | 8782 | 7620 | 12022 | |
| Total... | 8189 | 880 | 8,001 | 4,222 | | 528 | 354 | | 43,642 | 1,42,680 | 2,08,496 | |
| Per cent. per annum. | 3 71 | | 11.80 | | | 4.47 | | | 4.57 | 5.66 | | |

*Abstract of the Rates per cent. of Mortality in Calcutta.*

| | Christians. | | | Natives. | | General Mortality per Cent. | | |
|---|---|---|---|---|---|---|---|---|
| | Protestants. | Catholics. | Armenians. | Mahomedans. | Hindoos | Christians. | Natives. | All Classes. |
| 1st Period of 15 years, when there were no Returns of Native Mortality, ...... | 3.33 | 12.73 | 3.77 | 0 | 0 | 6.0 | 0 | 0 |
| 2d Period of 16 years, embracing all Classes except Greeks and Native Christians of whom there is no Census, ...... | 4.6 | 10.93 | 5.13 | 4.57 | 5.66 | 6.5 | 5.36 | 5.69 |
| General Average...... | 3.71 | 11.80 | 4.47 | 4.57 | 5.66 | 6.3 | 5.36 | 5.69 |
| | *Population of Calcutta according to last Census.* | | | | | | | |
| | 7,884 | 3,341 | 6,36 | 59,622 | 1,57,418 | 11,861 | 2,14,040 | 2,28,901 |

## *Analysis of the Report of Surgeon F. P. Strong, of the Bengal Army, to the Bengal Government for 1847, of the Mortality in the Jails of the 24-Pergunnahs, Calcutta.* BY LIEUTENANT COLONEL W. H. SYKES, V.P.R.S.

[Read before the Statistical Society of London, 20th November, 1848.]

DR. STRONG has been good enough to transmit to me recently his Official Report for 1847 to the Bengal Government of the Sickness and Mortality in the Jails of the 24-Pergunnahs. Dr Strong has had medical charge of these jails for many years, and has distinguished himself by the benevolent perseverance with which he has experimented in various ways to improve the health of the prisoners in his charge, and diminish the high rate of mortality that appears generally to result from confinement in the jails in India. Ventilation, exercise, occupation, and diet, have engaged his attention, but particularly the latter, and to having effected an improvement in the diet, by an increase of animal food and condiments, Dr. Strong attributes a decidedly diminished annual mortality among the prisoners. Dr. Strong's report comprises the prisoners in the Alipore Jail, who are confined for life, and whose annual average number, from 1836 to 1847 inclusive, ranged from 1,066 to 1,507, and the average for the whole period was 1,301; it comprises also the temporary prisoners in the Zillah jails varying from 611 to 902, the average for the period being 769; and, finally, the Insane Hospital patients, for the same period, varying from 186 in 1816, to 202 in 1847, in 1824 the number being as low as 102. Dr. Strong supplies figured statements from official records, of the sickness and mortality in the several jails under the old and new diet systems, and in the Insane Hospital; but, as my object is rather to call the attention of the Society to a remarkable cholera return for thirty-one years than to discuss the general mortality in jails in India, it will suffice to mention that in all the jails under Dr. Strong, for the first sixteen years, from 1820 to 1836, the mortality was 8¼ per cent. per annum, and for the last eleven years, from 1836 to 1847, the mortality was reduced to 5·57 per cent. per annum, the mortality of the native inhabitants of Calcutta, being, in the last period, 4·64 per cent.; the greatest mortality in the jails, as in Calcutta, being in the coldest months.

To show the effect of improved rations, of two meals per diem instead of one, Dr. Strong adduces the prisoners confined for life in the Allipore Jail, who never leave the precincts of the jail, as contrasted with the prisoners in the other jails, who had only one meal per diem until latterly, when the mortality with them was also reduced to nearly the same amount as in the Allipore Jail. The annual deaths, inclusive of those from cholera, in the Allipore Jail, from 1836 to 1847, both years inclusive, varied from 2·99 per cent to 9·80 per cent., the average being 5·60 per cent. In the other four suburban and Zillah jails the annual per centage mortality varied, as the diet was changed, from bad to indifferent and good. From 1836 to 1847 inclusive, Dr. Strong gives eight periods in which he shows that in the first period, with insufficient diet, the mortality was 7·95; in the second period of 26 months, with a good diet, the mortality was reduced to 4·30 per cent; for two periods of 15 and 12 months, the former diet was restored, and the mortality rose respectively to 9·44 and 7·71 per cent., 2·99 per

cent of the larger amount however, being attributable to cholera, in 1842. For the next four periods, the good diet of the daily rations was restored and the mortality fell respectively to 5·65, 4·76, 3·16, and 3 91 per cent.

The average of deaths in the Lunatic Asylum for ten years, from 1833 to 1842, was 16·9 per cent, and for five years, from 1843 to 1847, the mortality was 17·3 per cent. which Dr. Strong shows from tables that he quotes to be infinitely less than in the asylums in Europe. At Sunavra, in Italy, the deaths are represented as 42·5 per cent. ; at Paris, 35·6 per cent. ; and at ten asylums, in 1837, in England, 21 per cent.

Dr. Strong gives a table showing the advantage of exercise and amusement to lunatic patients, and says :—" The employment and amusement of the convalescent insanes are various. When the floors became so damp from age that they could not lie upon them, they constructed raised platforms of bamboo for beds themselves. Singing, dancing, cards (not gambling), the drum, fife, &c , are encouraged ; some women spin, some make cloth, pick coffee, rice, &c , and the insane men who exercise in the open air, have, for many years, been constantly engaged in sowing, transplanting, and rearing coffee, a quantity of which was packed up and sent, by the ship " Warrior," to the Hon Court of Directors, in 1832, and some to the Royal Asiatic Society, and was highly approved by the London brokers." Every description of gardening has been adopted by those willing to work, and this activity has been, Dr Strong thinks, the chief means of curing and discharging many. When the American cotton seed was introduced, the insanes were amongst the first to raise the plants ; large quantities of Otaheite sugar-cane have been produced by their labour, and cuttings of the cane, cotton, and coffee plants have been sent to various parts of India from the garden of the Insane Hospital. The cactus plant has been extensively reared, and the cochineal insect produced. The Spanish arnato the Sapan Wood of Commerce, mulberry plants, and the cassada which produces tapioca, have all been cultivated ; and latterly the aloe, from the fibre of which rope of great strength has been made. I mention these facts to show that the celebrated Hanwell Asylum system had a prototype in India.

The second return of Asiatic cholera to our shores, after an absence of sixteen years, gives considerable interest to the most complete table of cholera statistics for 31 years, from 1817, the date of its first *record* in Calcutta, to 1847 inclusive, that has hitherto been compiled. I say the date of the first *record*, because there can be little doubt, although its ravages were not systematically recorded before, that it was nothing less than the cholera that ravaged the Mahratta army under Hurree Punt, on the Toongboodra River, in 1786* ; and it is equally a matter of certainty, that Sir Edward Hughes's squadron suffered from the malady when off Ceylon in 1782 ; and Arungzebe's army also, at the siege of Bijepoor, in 1657 suffered from it. Indeed, Dr. Allan Webb, Professor of Descriptive and Surgical Anatomy, in the Calcutta Medical College, in a second edition of his " Pathologia Indica," published in the present year, quotes passages from Hippocrates, Whang-shoo-ho, his contemporary in China, and Susruta, the greatest Hindoo medical authority, to show that the disease called Asiatic cholera was known in the earliest times of Greece, China,

* Hurree Punt, in his own hand, writes, " The loss sustained by the Army in consequence of the Cholera Morbus is very great. Medicines are liberally supplied ; some do recover, but by far the greater part die."—Grant Duff's History of the Mahrattas, vol. iii., p. 17.

and India. It matters not much whether it be of ancient or modern date, beyond the assurance involved in the fact of its antiquity, that neither its supposed frightful ravages, nor the other pestilences to which man is subject, have prevented the gradual spread of his race all over the earth; genera of gigantic and wonderful animals have been created and disappeared, but war, and famine, and plague oppose their barriers in vain to the steady increase of the human race.

Dr. Strong's remarkable table contains, not only instructive facts for the professional man, but consolatory assurances that ought to alleviate the usual panic that pervades all classes of society into which the cholera unhappily intrudes. I have shown, in a paper published in the Journal of the Statistical Society, upon the Vital Statistics of the East India Company's Armies in India, for 20 years, both European and Native, that the deaths to the strength from cholera amongst Europeans in Bengal, was 1·15 per cent. of the strength, and for one year (1843) only in that period, it attained a maximum rate of 2·13 per cent.; amongst the native troops in Bengal, the average for 20 years was 0·22 per cent., once only in 1843, having attained nearly a third per cent. Amongst the Europeans in Madras the average mortality was 0·42, per cent. to the strength, and a maximum rate of 1·379 per cent. occurred in 1825,—in 1843 the rate was only 0·219: amongst the native troops the average mortality was 0·583 per cent., but a maximum rate occurred, as in Bengal, in 1843, of 1·385 per cent. Amongst the European troops in Bombay the average mortality to strength for 20 years, was 0·565 per cent. a maximum rate in 1·912 per cent having occurred in 1842, preceding the fatal year of Bengal and Madras; the average mortality of the native troops of Bombay was 0·281 per cent., a maximum rate of 0·598 occurring in 1842. The average mortality of all the European troops of the East India Company in all India for 20 years was 0·724 per cent. of the strength, and of the native troops 0·342 per cent.

It is satisfactory to find these results in close conformity to those of Dr. Strong's table, which are founded upon facts obtained under such favorable circumstances for their accurate accumulation; having the parties within the four walls of prisons, controlling their actions and their diet, and having daily records of their condition. I am not aware that for so lengthened a period as thirty-one consecutive years, any other cholera return exists, similar to that of Dr. Strong, who had such unusual facilities for investigating the frightful disease in all its various phases.

The return embraces the number of prisoners, the number of cholera sick, and the number of cholera deaths for every month of every year, from 1817 to 1847, both inclusive. The first striking feature of the table, is that there is not any one *year* of the whole series in which there was not cholera in the jails; and what is equally remarkable, with exceptions to be mentioned, there was not any one *month* in any year in which the cholera was not present among the prisoners. The exceptions are, the month of January in the years 1840 and 1845; April, 1840 and 1845, June 1831 and 1845; September, 1832 and 1841; October, 1841 and 1846; November, 1843 and 1847; and December, 18[illegible] and 1841. The months of February, March, May, July, and August, were never free from cholera in any one year. The disease, therefore, took its place with the ordinary diseases to which man is subject in India at all times,—dysentery, fevers, liver, spleen, and all the ills that flesh is heir to, and yet the average mortality from cholera to the strength, for 31 years, was exactly one per cent.; the average mortality from all causes, for 27 years, being 7·11 per cent.

in the jails of the 24-Pergunahs, while the mortality in Calcutta, for the same period, was 4·64 per cent. Here we have a most important and consolatory fact; the disease, permanently located within the walls of prisons, under the most favourable circumstances for its development and spread, from the constrained juxtaposition of parties, produced only 6,531 cases in 31 years to an annual average strength of 1·863, or about 11¼ per cent.; so that, whether the cholera be contagious or be not contagious, only one in nine persons was susceptible of taking the disease, when constantly exposed to its influence, and only one-eleventh of those who took the disease died; the average loss of those treated for 31 years, being 8·86 per cent.

The next great feature of the table, is the effect of temperature upon the amount of cases, and upon the intensity of the mortality; and it is shown, that the mortality nearly follows the course of temperature, the greatest number of deaths being in the coldest and hottest months, as is the case in Calcutta, from diseases of all classes. But, although contrasted temperatures appear to occasion increased mortality in cholera cases, the relation ceases at this point, for the cases are fewest in the cold months, and most numerous in the hot months. For instance, in the months of November, December, January, and February, the proportion of cases to strength is respectively 0·92, 0·82, 0·68, and 0·89 per cent.; that is to say, under 1 per cent. per month; while, in the hot months of March, April, May, and the comparatively hot months of August and September, the number of cases were respectively 1·10, 1·14, 1·09, 1·01, and 1·06 per cent.; that is say, somewhat above 1 per cent. December is the only cold month in which the deaths are under 1 per cent. (0.88) of the strength; which is the more curious, as the preceding month of November is characterised by an average mortality, for 31 years, of 1·23 per cent. The mortality in the cold months of January and Feb. was respectively 1·10 and 1·26 per cent., and for March, April, and May, 1·50, 1·27 and 1·25 per cent. The setting in of the monsoon in June, reducing the temperature to a medium state between the cold and hot months, and saturating the air with moisture until the month of October, appears to have a decided effect, both upon the number of cholera cases and the intensity of its mortality; the per centage mortality is reduced nearly one-half in these months, amounting respectively to 0·59, 0·51, 0·68, 0·72, and 0·97 per cent. An equable temperature and elevated hygrometric state of the air, would appear, therefore, to be unfavourable to the spread of cholera, and to influence decidedly the ratio of the mortality.

Another great feature of the table exhibits some very anomalous characters; and that is, the apparently capricious changes in the amount of the annual mortality amongst the cases treated, but whether resulting from atmospheric causes, the idiosyncracy of individuals, or changes in the mode of treatment, Dr. Strong's report does not afford any evidence. For instance, the first year of the record of the cholera (1817), the deaths were 5·26 per cent. of the cases treated, the number of cases being 513. The next year, 1818, the deaths were 10·42 per cent. in 307 cases, the next two years, the mortality rose to above 12 per cent. in 285 and 391 cases respectively. The rate of annual loss then fell gradually until 1824, when it was only 2·87 per cent. in 414 cases. The mortality then gradually rose annually, until 1834 in which year it was 17.47 per cent. in 103 cases. The next year it fell to 4-29 per cent. in 163 cases, and it continued very moderate until 1840, when it suddenly jumped from 6·45 per cent. in 31 cases in 1839, to 19·69 per cent. in 66 cases in 1840. The next year the maximum mortality of the

whole period occurred, namely, 54·16 per cent. in 24 cases. In 1842 the mortality was 44·82 per cent. in 58 cases; the next year it fell to 28·88 per cent. in 45 cases. Nor has it since fallen below 20 per cent. in 1846 in 45 cases, and the last year of the return, 1847, gives a mortality of 22·72 per cent. in 22 cases. From the year 1838, the number of cholera cases fell suddenly from 185 cases to only 31 cases in 1839, and since that year until 1847, the maximum number of cholera cases in any one year, was only 66; but the ratio of the mortality had fearfully increased upon the smaller numbers. There are multitudinous instances where, in very many cases treated, there is not a single death; for instance, in the month of April 1822, there were 94 cases, and not one death; whereas, in January of the same year, there were 11 deaths in 31 cases. In March, 1822, there were 77 cases and 1 death while, in March, 1828, there were 14 deaths in 32 cases. In December, 1833, there were 5 deaths out of 10 cases, while, in the same month in 1835, there was not a single death in 12 cases; and in December, 1821, there was not a single death in 18 cases. These anomalies could be infinitely multiplied, and the table offers a useful study to the speculative physiologist. Notwithstanding these monthly anomalies, the annual totals of cholera cases indicate that in years when the cases were most numerous the ratio of deaths was least; and the greatest per centage loss (not the absolute loss) was greatest when the cases were comparatively few in the year. Dr. Strong does not offer an opinion whether these anomalies were to be accounted for by atmospheric causes, which it would have required a careful record of meteorological phenomena to have assisted in determining; nor does he say whether the varying mortality was connected with varying modes of treatment. In the absence of such essential information it would be hazardous to comment upon the facts as they appear; it is plain, however, that whatever may be the causes of the varying mortality, that, for no one year, nor for any one month of the whole period of 31 years, has the intensity of the mortality been comparable to that which is occurring in Edinburgh, in London, and the provinces, at the present moment.

Dr. Strong's table, in the absence of some necessary data, is, nevertheless, a very valuable document: to the actuary it is of great importance, for the averages running over so lengthened a period as 31 years, necessarily establish a normal state, that enables him to fix with precision the risks that he runs in his insurances; and if the table were generally known it should have the effect of abating that unreasonable panic which the presence of cholera in any locality in Europe appears instantly to produce; for, under the most favourable circumstances for the development and spread of the malady, within the walls of prisons, where it has lasted perennially, where it was impossible for individuals to escape from its influence, and where depression of mind from confinement, and the absence of proper exercise, predisposed to disease, and where the usual annual mortality in the jails is nearly, if not quite double that of the population of Calcutta, we yet see that about one in ten persons only was susceptible of taking the disease, that the average of only 8·86 per cent. of those attacked died, and that only 1 in 100 individuals exposed to it lost his life. Whether, therefore, contagious or not contagious, we have proofs that we may acquit ourselves of our duties to our neighbours with the guarantee that we expose ourselves comparatively to little risk, commensurate with the good that an active benevolence may produce.

*Abstract Table shewing the Mortality, first of the Zillah Jail of the 24-Pergunnahs, and, in the middle or second line that, of all the temporary convicts in suburb Jails, including those in the Zillah Jail, begining from May 1838, the commencement of the ration system for such classes.*

| Remarks on column I. For May, June and July, some Fish, Ghee, Spices, and Vegetables, were added, and in suitable quantity, with the effect of allaying the complaints, and tumult among the Prisoners, and in August given up and the insufficient ration again given. | First. 15 months bad food 3 months, May 1838, July exclusive. | Second. 26 months good food Aug. 1839 to Sept. 1841 inclusive. | Third. 15 months bad food Oct. 1841 to Dec 1842 inclusive. | Fourth. 12 months bad food. 1843. | Fifth. 12 months good food. 1844. | Sixth. 12 months good food. 1845. | Seventh. 12 months good food. 1846. | Eighth. 12 months good food. 1847. | Ninth. 12 months good food. 1848. | Tenth. 12 months good food. 1849. | Eleventh 12 months good food. 1850. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Labouring, ... ... ... ... | 9.23 | 4.71 | 11.17 | 9.56 | 6.44 | 7.62 | 4.68 | 5.44 | 4.37 | 2.40 | 1.88 |
| Non-Labouring, ... ... ... | 0.0 | 0.30 | 0 0 | 2.73 | 5.06 | 6.41 | 0.0 | 0.0 | 1.75 | 1.09 | 3.29 |
| Hindoos,... ... ... ... ... ... | 6.40 | 3.81 | 10.45 | 8.08 | 7.09 | 8.56 | 5.74 | 3.18 | 2.90 | 0.61 | 2.17 |
| Mussulmans, ... ... ... ... | 4.00 | 2.41 | 7.09 | 8.0 | 4.31 | 2.56 | 0.70 | 4.94 | 4.50 | 2.91 | 4.12 |
| Untried,... ... ... ... ... ... | 26 27 | 8.39 | 48.0 | 8.45 | 3 33 | 5.46 | 1.85 | 0.0 | 0.0 | 0.0 | 2.85 |
| Debtors, ... ... ... ... ... | 0.89 | 2.46 | 4.0 | 1.95 | 5.88 | 6.82 | 2.90 | 3.57 | 0.0 | 0 0 | 9.37 |
| Females,... ... ... ... ... ... | 0 0 | 2.67 | 4.0 | 3.51 | 5.13 | 9.30 | 0.0 | 1.93 | 0.0 | 4.44 | 0.0 |
| Total in Zillah Jail only, ......... | 5.42 | 3.25 | 7.84 | 8 07 | 6.22 | 6 28 | 4.53 | 3.81 | 3.52 | 1.49 | 2.97 |
| All the convicts of temporary Jails & Zillah Jail also,......... | 7.95 | 4.30 | 9 44 | 7.71 | 5.65 | 4.76 | 3.16 | 3.91 | 4.91 | 3.19 | 3.62 |

Deaths per cent. per annum under the periods of the ration objected to, 8.38 } reduced mortality by half to a point.
Deaths per cent. per annum under the periods of good rations, 4.19 }

The bottom line shews the mortality of the Life convicts who have always selected and cooked their own food.

| The Allipore Jail Life Prisoners only, ...... | 5.12 | 5 23 | 7.80 | 9.80 | 5 72 | 4.19 | 4.12 | 4.03 | 5.01 | 4.54 | 5.53 |
|---|---|---|---|---|---|---|---|---|---|---|---|

From 1829 to 1837 the mortality of the entire Prisoners, Life and Temporary, averaged 8.74 per cent. per annum; of this, the mortality among the Life convicts was assertained to have been only 5.25 per cent. per annum. Since 1837 it has averaged only 4.83 per cent., with the exception of the two periods and cated in columns 3 and 4 making, 27 months in 1841 2 and 3, during which period, eleven compound high partition walls were in the process of erecting. The greater mortality was among the Zillah Convicts, up to 1837, but this mortality has been brought to approximate, and latterly, to be even less, than that among the Life Convicts, since, their improved, and additional allowance.

N. B.—It should be remarked that for the last seven years, there has been no addition to the Life Prisoners, who have since 1843 all been transported beyond seas, and only remain in the Allipore Jail for short periods before embarkation · the remaining old hands have, as the last line shews, remarkably good health.

In 1835 July. The S. N. Adaw'ut at my request for statistical observation allowed the two classes of prisoners to be made out in separate Tables. In this year the Magistrate reported to the Prison discipline committee that the average age of these Life Convicts was 44 years those now living exceed that age.

F. P. STRONG, *Surgeon, 24-Pergunnahs.*

***No. 5; 1837.—The Magistrate of the 24-Pergunnahs on the heathiness of the districts, with remarks on the health of Prisoners and the management of them; with Tables of the proportion of sick to Prisoners, the proportion of deaths to Prisoners; and the proportion of fatal cases of cholera among Prisoners to those attacked with that disease for the last 20 years,—also a Table shewing the mortality among the natives in Calcutta for the last five years, and of the other sections of the population of the last 20 years.***

*The Tables will now be found in page 19 and following pages in the Yearly Report from the Surgeon of the 24-Pergunnahs on the dieting, &c. &c. of Prisoners, and these Tables extend to 30 years, therein will also be found Tables shewing the mortality of cholera to those attacked by this scourge, and also to the average daily number of prisoners for the same number of years.*

To J. H. PATTON, Esq.

*Magistrate of the 24-Pergunnahs.*

*May 18th*, 1837.

Sir,—In reply to your letter of the 17th of April, relative to the selection of the districts to which prisoners under sentence of banishment are sent, and to the climate of any such districts being likely to prove prejudicial to their general health, and also as to the climate of the district and station under my charge, and requesting my opinion whether it is uncongenial to the constitution of any, of the prisoners confined in the jails:—I beg to say that in taking this subject into consideration, perhaps I may be permitted to take into view in some degree, the effect of the climate upon the health of other classes besides prisoners, and if we had full and sufficient data to go upon, it might be desirable to compare the rate of mortality amongst prisoners in the zillah or district with that of the laboring classes forming the mass of the general population.

The atmospheric changes which began in 1817 to produce cholera, which then became, and has since continued an epidemic disease throughout India, and which has increased the

mortality among prisoners as well as among the inhabitants of this country generally, is not yet understood, and other causes with which we are nearly equally unacquainted, sometimes occur and render places that have been considered healthy, unhealthy.

I may here be allowed to state that Lord William Bentinck almost immediately after his arrival, upon hearing that I had interested myself upon the subject of malaria, desired that I would communicate my sentiments to his Lordship, and after some interviews I gave his Lordship papers relating generally to the healthiness of Calcutta, and its suburbs; and in a third written communication, I stated that—"The last year (meaning the year 1828) has been more healthy than any I have known, and is the first year since I have been surgeon of the suburbs that I have not had an additional number of native doctors, 20 or 30, stationed at different posts, with medicines and instructions to administer to every case as quickly as possible among the natives, and I believe Calcutta itself has equally escaped the scourge (cholera) this year; certainly Calcutta and the Entally suburbs have been generally more healthy than usual." Since this period, four unprecedented inundations have occurred, in 1831, 1832, 1833 and 1834 which must have acted considerably in deteriorating the climate for a time, but with this exception, and always making an exception of the broad belt of dense jangal, dirty tanks, jheels, luxuriant swards and swamps, which exist close upon and beyond the Mahratta Ditch, and extend all round the city, and which formed the more immediate object of my communications with the Governor General, I am of opinion that the Sudder station of this district is among the most healthy of any in Bengal, and I much question whether there is any Bengal civil station where the public health will be found better than at Allipore.

I will now proceed to consider the effect of this climate on the prisoners for the last 20 years, during the whole of which time the cholera has appeared as an epidemic; and with a view to shew at once glance the proportion of sick to the prisoners, as well as the mortality among them; I annex two tables, both beginning with the year 1817, and ending last year: one shews the proportion of sick, the other the mortality. The first four years, my predecessor Dr. Young, was in charge of the civil duties of this station, and the table shews the average monthly proportion of one sick to eleven prisoners for the four years, while it will be seen that the monthly average proportion of deaths for the same period was one death to 176½ prisoners.

The last sixteen years shews an average monthly proportion of one sick to 21¼ prisoners, and the average monthly proportion of deaths for the sixteen years, appears to be one to 190¾ prisoners. And to prove that the climate has been more healthy to prisoners than was anticipated it would have been twenty-seven years ago, I beg to refer to a letter of my predecessor Dr. Young, to the Secretary to Government in the Revenue and Judicial Department, dated the 1st of December, 1811, he says, "There is every reason to hope from the great attention which is now paid to the cleanliness and internal economy of the prisons, that the convicts will be generally much more healthy in future; there is however no reason to suppose that there will be at any time fewer in hospital than *one in ten* of the whole number of prisoners, there has been frequently during the past year more than twice that proportion under my care."

And I here beg to state for the information of the Commissioner that inquiries having of late been made into the causes of mortality and sickness among prisoners generally, I in answer to a circular letter to Mr. Adam, the Secretary to the Committee on convict's labor, entered into questions of a similar nature to those now referred to, and I trust I may be permitted to give some extracts from what I then wrote as bearing upon the same points.

In my reply to Mr. Adam dated April 6, 1836, I quote this letter of Dr. Young's and remark

"From this it will be observed that the proportion of sick in hospital to prisoners has been far less than was originally anticipated. I beg to state that I have made this reference, because it goes in a great measure to answer points about which your committee appear anxious to become acquainted; viz., the comfort of convicts in jails. When Dr. Young wrote this the Allipore great jail was just finished. It was to contain prisoners for life, others previous to transportation, and some from the up-country zillahs of a more than commonly turbulent character, condemned for a series of years to labor in irons. These were prisoners of all ages, and many arrive at an advanced age. Previous to this period, the convicts did not enjoy the cleanliness and comfort this capacious and airy jail afterwards afforded, and I may add a sufficiently capacious hospital was attached to it, upon illness medical aid was immediately resorted to, and this hospital received all the sick from the two jails and from all the road gangs, and I have continued the same monthly returns that Dr. Young always made to the Sudder Nizamut Adawlut. In the lessened proportion of sick to prisoners will be seen the advantage of good, dry, clean,

and airy accomodation, but as regards mortality, the Allipore jail cannot be said to afford a criterion of the rate of mortality among prisoners generally, because it contains an immense number of convicts from the Western Provinces who are confind for life; and vast numbers die in the jail of mere old age."

I further added—"As far as my experience and observation will permit me, after a performance of those civil duties for nearly sixteen years, I will endeavour to afford every information in my power, and I am thus far able to speak with cofidence that the prisoners in the Allipore jail are the most stout and healthy of all the prisoners. Many have attained a great age, and are infirm from age only, and many die a natural death; yet I have found at all times the proportion of sick to prisoners, small as compared with those from the working gangs. They are better housed and better fed than the others, they nearly all of them eat ata instead of rice, or mix, or change it with rice, which as food is more nutricious; a more liberal allowance of money daily enables them to do this.

"The situation of the jail is particularly healthy, it is very large, dry, and airy, the convicts work in the shade, they have shaded accommodation for cooking their food, and are consequently not exposed to the inclemency of the weather to the heat, and cold, the sun and rain, to damp and obnoxious malaria, like the men who work upon the roads, with less allowance to purchase their comforts.

"These considerations induce me to think that if some indulgence was shewn to the working gangs, such as being put on the same allowance as those in the Allipore jail, employing them in some in-door work when the weather was very bad, and always having shaded places wherein to cook their food; in fact, to place them more upon a par with the working classes, there would be much less sickness among this description of convicts than there is at present. I find from my own observation, as well as from the report of the European Overseers, that the up-country convicts support the fatigue of road-working quite as well, if not better, than Bengális, and that they are generally preferred for labor. If the road-gangs could afford to purchase ata, and if some attention was paid to their comforts, I do not think their working on the roads would be detrimental, and I am of opinion that a saving both in life and health would be the result."

The inmates of the Allipore jail are all of them banished prisoners, generally 1,200 in number, and separating them from the rest, and making a comparison of the mortality

among them for the last ten years, I find the mortality to be 5¼ per cent. per annum, which is less than the mortality of the prisoners in the zillah jail and those upon the suburbs roads. I cannot therefore consider that the climate acts very injuriously upon those banished to Allipore for life, though some allowance should be made for the comparative comforts they enjoy, and which I have already remark upon.

If I am to consider the prisoners who have been sent from the 24-Pergunnahs zillah jail to Burdwan as banished prisoners, they appear to me to have much deteriorated in health since they left this zillah. and the mortality has been great, since out of 1[illegible]8 pisoners who were sent to Burdwan in January last year, 19 died in the year; but whether they have suffered from climate or from any want of attention to their necessary comforts and lodging at night, it is difficult for me to decide with precision. Of the last batch of seventeen who went to Burdwan in January last, two are dead and several have returned in a very weakened state, and are now in the Allipore hospital; indeed a quarter of the number of the entire prisoners just returned from Burdwan, are sick in hospital. I had reported officially to you on the 12th of January last that these seventeen prisoners all appeared in good health, but that their fetters, each weighing three pounds and a half, and one man's 10 pounds, were too heavy, and you had them changed, and as I find their legs have not suffered from the fetters, this want of health among them must be imputed to some other cause.

In answer to Mr Adam as to my opinion of the cause of the great sickness and mortality that took place among the different zillah prisoners sent to work on the Burdwan road, and which led to the appointment of the Committee of which he was Secretary, I stated, that—

" Other medical gentleman who have visited the Burdwan road, will be better able to judge of the cause of the mortality than myself. I have already alluded to malaria as an almost universal cause of sickness ; and as to the localities and the physical conditions which combine to render places insalubri-ous, it would require too much space to enter upon here. Perhaps the best way of answering that question will be by stating that filthy tanks, jheels, luxuriant swards, jangal and damp and dewy nights, are among the constant causes of fevers, dysentery, spleen, palsy, and various other diseases, and ought to be guarded against ; and I should here state in answer to the question whether I ascribe the above mentioned effects to the influence of climate or to the use of food and water to which the patients were not accustomed, that I

am of opinion after many years' consideration of such investigation, that generally speaking the occasional use of bad food, or bad water, would go but little way in the production of such diseases, compared with the more extensive cause malaria. No doubt bad food, which would not keep up the strength of a working man, would so reduce him, as to render him more susceptible, but good food will not prevent the effect of this deadly poison upon those exposed to its influence, and such exposure, to a great extent, with hard work in fetters in the sun and rain, adopted inconsiderately, would be likely no doubt to cause great mortality, particularly by cholera."

As regarded their confinement by night, I added,

"I think if the night-guard watch properly, there will be no necessity of passing chains through the convicts' legs. This double night-chaining I never saw, but I am satisfied it must be attended with numerous evils, so obvious, that it is unnecessary here to enter into the subject further. This night-chaining of convicts together by the legs, as well as the heavy bar irons in common use, ought, I respectfully submit, to be abolished, as has been the barbarous punishment of the korah, a punishment it has been my painful duty often to witness officially. I am emboldened in these remarks as your committee require my aid as a question of humanity."

I have stated the evils of night-chaining as obvious, because I think it only requires a moment's consideration to see the injurious effects upon the health of the prisoners, their, being so linked as to be obliged to lie close together, and often, as I am told, with the absence of all convenience to those who require to get up.

The paragraphs I have copied were written more than a year ago, and I would now wish to add, that the greater number of cholera cases which are exhibited in the table annexed, occurred among the convicts in the zillah jail and those on the roads, and that comparatively speaking very few cases of cholera occur among the prisoners in the Allipore jail; and the observation of this particular circumstance, among other considerations, led me to make the remarks in a former part of the letter, that if some attention was paid to the comforts of the road-convicts, it was my opinion that a saving both in life and health would be the result.

A new guard-house is now building in a healthy spot for the Moochekola gang, and I hope I may be allowed to repeat my opinion as expressed in my letters of last year and the year before, that if raised mutchans and well necessaries were adopted in all the road gang establishments, it would be highly conducive to the health of the convicts.

As regards the necessity of some change of system in the necessaries in the Russapaglah zillah jail, and which I have already brought to the notice of Government, I may state that the superintending surgeon quite agrees with me as to such necessity, and he gives his opinion in favor of the well necessaries; and although these prisoners now are allowed rations instead of money, yet as they have to cook their own food, my opinion is still unaltered that they should have a shady place to cook under upon their returned from work.

Considering the mode of constraining prisoners to be of the greatest importance as regards their health, it will, I trust, not be considered irrelevant my here repeating what I said to Mr Adam upon the subject of fetters. I said,—

"The chains, or more properly speaking fetters, those worn formerly by the prisoners of this sudder station, have been of every form, length, kind, and variety, and sometimes extremely heavy, and they were until lately almost all *bar*-fetters; and as to the number of ulcers I may have had, I beg to state that in October, November, and December, 1832, I had 80, 98 and 65 cases of ulcerated legs at one time in the Allipore hospital. One of these turned out to be fatal, and on other occasions such has been the case: the two previous months, three cases were fatal. The form and construction of chains I would recommend for perfect security, and for the attainment of the greatest amount of labor with the least bodily pain to the convicts will appear from my official correspondence upon that subject with the Sudder Nazamut Adawlut; and in answer to the question about the weight of fetters, I should say that I consider the maximum weight might be 2 pounds, the medium I pound and ¾, and the minimum I pound and a half: perhaps if the medium was adopted as a general regulation chain, it would be better than having three different kinds; the links should be rather long, and 3, 4, or 5, in number, to each leg. From what I have heard of chains being passed through the prisoners' legs at night, I consider that the convict is often deprived of the rest and sleep necessary to health. I will endeavour to suggest a mode of building and guarding to avoid this necessity, in another place.

"In my remarks in the last six months' returns for 1831, I brought to the notice of the Sudder Nizamut Adawlut the great number of ulcerated legs produced by fetters, and recommended the lightening of them if consistent with safety; and in answer to the Court's letter requesting me to submit a special report on the subject of ulcerated legs among the prisoners, with any suggestions which might seem likely to

guard against the evil, I stated my opinion that the sores on the feet and legs of the prisoners did arise in general from the friction of the fetters, and I suggested the use of properly constructed leather or mozehs, to be worn under the rings, and I still more strongly advised the substitution of linked *chain*-fetters in lieu of the long iron bars in general use. I stated my belief that with such chains the prisoners would be able to work better, and with greater ease to themselves, than they can from the inconvenient straddling position they are constrained to adopt in walking and in working caused by the straight iron bars, and that I thought the continued fretting and friction occasioned by these bars would be avoided, or at all events greatly lessened.

"In answer to the Medical Board's circular, I again urged the adoption of the change above alluded to regarding fetters; and some time afterwards having been sent for by Lord Bentinck upon the subject of prisoners, I gave in a memorandum in which with respect to fetters I thus express myself:—'I trust that the Government will be moved to take into consideration the propriety of having *chains* in lieu of *bar*-fetters for all prisoners, and that one general regulation chain constructed of the best iron, be manufactured under the superintendence of some officer in the service, and sent to the different zillahs, or that a model of the same should be sent, so that no difference may exist as to either the weight, shape, or the quality of the metal: for refractory prisoners double chains of this kind would do no harm, but I have observed the greatest inconvenience arise from the use of bar iron.'

"After this period and in communication upon the same subject with Captain Jenkins, the Commissioner of Assam, he sent me down a drawing of a chain he proposed, and I believe adopted, which by means of a lock or spring took the chains from one leg of a prisoner, and it was otherwise disposed of while he worked, after which it was again brought on the leg. I cannot exactly recollect the peculiarity of this chain, but I thought it so ingenious that I sent it to the private Secretary, who had already procured a model of a link chain. In my answer to the Medical Board's circular above alluded to, I also stated that I thought the greatest grievance prisoners suffered under was their fetters, and I enclosed my correspondence with the Sudder Nizamut Adawlut upon the subject. I also remarked that I had made a calculation of the number of ulcerated legs and sores, as compared with the sick in hospital at the end of each month for the last eighteen months ending December 1833 and that I found the proportion as one in three or one-third: I added that nearly

all the irons I had occasion to remove were bar irons, which however light must be a constant hinderance and annoyance to men moving about or having to walk a considerable distance I have found a party of prisoners, who had all bar irons, arrive with nearly all of them having ulcerated legs: and in allusion to a central gang of prisoners who had been for many years located behind the general hospital, having a year before been broken up and sent to the Russapaglah jail, I remarked in consequence of having observed great sickness among them, that since their removal, they had to go a great distance to their work, which to men wearing bar-fetters must have added greatly, not only to their bodily labor, but to their exposure to the heat of the sun, and to the inclemency of the weather, and must be calculated to affect their general health. In my last January remarks in reference to the 18 months' comparison already alluded to, I stated, "I have now made a similar comparison for the last eighteen months and find the proportion of ulcerated legs as one to twelve only (meaning as compared with the sick in hospital at the end of each month and including the most trifling sores), which I conceive to be the result of more care and attention being paid to the fetters, but more particularly to the circumstance of *chain*, instead of *bar*-fetters, being more generally used than before;" and in my last six months' returns, I stated the number to be about half a dozen at a time in the hospital, and all those sores of a most trifling nature.* The bar-fetters are injurious in a variety of ways: for instance, after a convict is fatigued with carrying a basket on his head for a long time, he sits down to rest with his knees up, the weight of the bar fetters press the rings down with considerable force on his instep and ankles, and there constantly produce sores or swellings, often of a severe and debilitating description, or such may be caused at night during sleep The junction of these bar irons to the rings is often badly arranged, not having play enough, and this portion of the bar-fetters will often do mischief. I cannot think that this mode of making convicts labor is either humane or useful, besides, independent of the loss of the convict's labor while in hospital, he causes a considerable expence to the state in medicines, dressing, and increased diet, necessary to keep up and support his emaciated state, which is often fast sinking when ulcers take a bad turn; and I should add that the same sores are constantly breaking out again and again, and the patients as often coming into hospital. From inquiries I have made I find chain links are in general use in England,

* Ulcerated Legs since the almost general adoption of chain-fetters are now quite uncommon.

and a gentleman just returned from Van Dieman's Land says, "that chains are universally adopted there." As my opinion is asked as a question of humanity, as well as of public improvement and of economy, I would beg to give an important and additional reason for abolishing the use of bar-fetters altogether. It is this, that a man long accustomed to the use of such fetters, cannot for a great length of time recover his natural mode of walking, by which he is known to the public as having been a prisoner, which is highly calculated to prevent his obtaining an honest living. Many years ago, the magistrate of Furridpore, in consideration of such awful consequences, both to the liberated prisoners and to the public, adopted the plan of gradually taking off the bars, until at last the prisoners, who were upwards of 1 000 in number had, with very few exceptions, only the rings on their legs; only one man made his escape, and he was immediately re-taken. This gentleman says that in this he had two motives. one the encouragement of their labor, the other a matter of policy from observing that those released no one liked to employ, as they were marked and conspicuous from their gait for a long time after their release which this measure effectually did away, and to it he principally attributed their being enabled to get employment."

I am happy to be able to state that for the last month there has not been a case of ulcerated leg in the hospital.

From the details I have given, if we are to look to the effect of climate alone, as forming a criterion of the general health of the prisoners banished to the station of Allipore, I think it will appear that the climate is not unfavorable; and in allusion to what I have said of the old age of many of these prisoners banished for life, I would beg to enclose a list of several prisoners now in the jail, who have attained very advanced ages, some upwards 80 years and several between 70 and 80 years, and it will also be seen that of these some are natives of the Upper Provinces. I have sometimes noticed in my monthly returns to the Sudder Nizamut Adawlut the old age of some who die; as for instance in my November returns for 1831, I state—"The deaths are numerous this month, and chiefly dysentry, many were very old prisoners and several of very old age, one 90, another 82, another 75. two were 70, and others considerably advanced in years." But it is not to the effect of climate alone, that we are to look. in considering the general health of prisoners in a district. The climate, as I believe this to be, may be as favorable, or more so, than most others in the same part of the country, and yet the returns of the sick

amongst the prisoners may be swelled out by the various other causes of sickness I have alluded to, and as in the instances I have given, prisoners in health may be sent from a district and return sick, as those sent from this district to the Burdwan road. My allusion to this, I trust will not be thought irrelevant, when it is considered that they now form a considerable part of the sick under my own charge and go to make my own returns of sick greater than would otherwise be the case, there being upwards of twenty of the returned prisoners in hospital, or as about 1 sick to 4 prisoners, while the average porportion of sick for the last sixteen years has been 1 sick to 21 prisoners. This latter remark is also applicable to the returns of sick for those periods when they were increased by the number with ulcerated legs from the bar irons, a cause of illness quite independent of climate. The prisoners who are just returned from Burdwan were, when in this zillah, used to some regularity, they were well housed in the Russapaglah jail, and I believe all who chose it were accustomed to fish* as part of their food; besides which, they had not their night's rest distrubed by any uncomfortable mode of confinement, therefore it is not easy to say that the climate where they were sent to work, was, alone, inimical to these men: if it was the climate alone, the guards ought also to have suffered.

As bearing upon mortality, I have drawn up the annexed table of mortality from authentic sources; that of the Natives I can only procure for the last five years, and from this it will appear that I am borne out in my observation, regarding the effects of the inundations; and the other communities which are for 20 years, shew a greater mortality about the same period: they also shew, in common with the Native community, a decrease in mortality, and consequent improvement during the last two years.

Taking into consideration the increase of population, especially that of Europeans and excepting the peculiar years of the inundations, the general tendency of these tables shew that public health must have improved, and consequently that the climate has rather improved than otherwise. It is true these tables relate to Calcutta, and not to the country around, but if we had similar data to guide us, we might be able to form a more correct opinion of the climate.

I have &c.

(Signed) F. P. STRONG,

18*th May*, 1837. *Surgeon, 24-Pergunnahs.*

* Admitted to have been not equal to a quarter of what the Medical Board consider necessary.

To F. P. STRONG, Esq.

*Civil Surgeon of Zillah 24-Pergunnahs.*

2nd June, 1839.

Sudder Dewanny Adawlut.

Present.

R. H. Rattray, W. Braddon and C. Tucker Judges } Esqres

A. Dick and J. F. M Reid Tempy. Judges } Esqres

SIR,

In compliance with the request contained in your Letter dated the 28th Ultimo, I am directed by the Court to transmit, to you a copy of the Documents therein mentioned, as per List annexed.

I am,

Sir,

Yours obedient humble Servant,

J. A. F. HAWKINS

*Register*

Fort William, }
The 21st June, 1839. }

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LIST OF PAPERS.

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1. From Dr. Strong 28th February, 1838.
2. To Magistrate 24-Pergunnahs, 16th March, 1838.
3. From Dr. Strong 20th April, 1838, with enclosures
4. From Ditto, 21st April, 1838, with enclosures
5. To Magistrate 24-Pergunnah, 4th May, 1838.
6. To Government 25th May, 1838, with enclosures
7. From Session Judge 24-Pergunnahs, 10th May, with enclosures
8. From Dr. Strong 28th February, with enclosures
9. From the same. 23rd March, 1839.
10. From Magistrate 24-Pergunnahs, 18th April, 1839.
11. From Dr. Strong, 29th April, 1839, with enclosures

(Signed) J. A. F. HAWKINS

*Register.*

To J. A. F. HAWKINS, Esq.

*Register t Sudder Nizamut Adawlut*

Sir, 28 February 1838

In sending you my returns for the Allipore jail and that of the 24-Pergunnahs jail, the latter including the prisoners located in the suburbs, I would wish to bring to the notice of the Sudder Nizamut Adawlut, the great difference in the proportion of sick to prisoners, and in the mortality of the two departments.

I have often in my official returns, and correspondence, noticed this before, and as the returns have for the last eighteen months been by the orders of the Court made out separately, and not as has been the case in former years in one single report, it is easy to see at one glance the material difference I allude to. In Allipore jail, the last year gives 1 sick to 26¾ prisoners, the other departments 1 to 9¼. In Allipore 4¼ per cent. deaths per annum. In the other departments, 5¼ per cent. per annum, but in the Russapugla zillah jail, I find the mortality has for the last twelve months, been upwards of 7½ per cent., a great mortality, when compared with that of the 1200 prisoners *for life* it Allipore, while the proportion of sick to prisoners has been nearly one to *five*. It is true that a great many prisoners were returned from the Burdwan roads in a dreadfully weak state, but nearly every one of them recovered, and it was for a short time only, that the sick were increased in number by them. This casual circumstance therefore is not sufficient to account for the great discrepancy in the *sickness*, and *mortality*, in the two departments, which I have often brought officially to notice. I cannot help thinking, that *food*, its *quality*, and *kind*, has much to do in this difference of health, and mortality, tho' *other circumstances* may also assist in a *less* degree, in producing the deterioration of health in the zillah prisoners, who are convicted to work in irons for *a time* only.

Among other reports made by me officially upon this subject, I remarked, in answer to the medical boards circular of 1833, upon the great mortality which prevails among convicts *particularly those in Bengal*, that, I thought that prisoners who go out a great distance to work in dry weather, should have their food cooked where they worked, for if they return very late they are much hurried in preparing their meal, and have hardly time to cook it efficiently, and to eat it with any degree of comfort, before being locked up for the night.

And upon the same subject in answer to a circular from the Secretary to the Committee of convict labour, I said—"Upon the question of dieting, after considerable reflection, "and enquiry upon the subject, I find it extremely difficult "to form an opinion as to whether money, which has always "been the custom, or rations cooked and given to prisoners "is best. There is much to be said in favor and against, both "plans, but I think I have thoroughly ascertained that to alter "from the money allowance, to rations, would be thought "extremely cruel by the prisoners. I once thought rations "would be desirable, but from conversation with Gentlemen "who have had charge of prisoners, and others, including "overseers, I am inclined to give a preference to the usual "mode, four pice a day about Calcutta, the Allipore jail al- "lowance, is not too much, if a prisoner is to be fed at all like "a labourer, and to be kept in a state of health, and strength, "fit for work: three pice in districts, where as in Dacca, "Rice is very cheap, and fish, mussullah, turkarie, &c. equally "so, may be enough; I am inclined however to agree with the "author on Indian jails, that the sum now *generally* allowed "is too small, and that four pice, which is one anna, is not "too much, and not more than sufficient to preserve health "and to ward off a fatal termination when disease actually "occurs."

I agree also with the sentiments expressed in the above work on the necessity of convicts being allowed *two meals a day;* where peculiar circumstances prevent it, they should have time to get some jalpan, or fried rice, or gram, some part of the morning when they get a little rest; but I think this should be a regular meal, as is the case with all the Bengal ryuts, with our servants, and all the working people of the country; they have also their domestic comforts, whilst convicts have neither females to cook for them, nor have they always shaded places to cook under; but surely some plan might be adopted to place them more upon an *equality as to food* with other labourers, I have understood that the old *jail regulations* point out that a *reasonable* time should be allowed prisoners either at sun rise, or at noon, for their meal, and that they should be conducted back to their jail or huts in time to allow of their *evening meal* in comfort before being locked up.

I have been informed that the late Mr. John Elliot the magistrate of Tipparah, and afterwards, the superintendant of the Allipore jail, had houses erected at Tipparah, in the form of a square, in which the wives of the convicts resided, who

cooked their dinner for them, when they were at work on the roads, and brought it on their return ready cooked to the jails.

In my letter to the commissioner upon the subject of prisoners which was dated the 18th of May, 1837, and which I understand was forwarded by that gentleman to your court, you will see that I enter largely upon the subject, and strongly advocate that the zillah prisoners be put on the same allowance as the Allipore prisoners, viz. *four* pice a day instead of *three* pice ; It appears to me, that they cannot upon the latter sum, afford to purchase fish as food, I conceive essentially necessary for a working man in Bengal, and having in that letter rather freely given my opinion as to certain *other* causes which I believed tended to depress prisoners working upon the roads, I need not again repeat what I there said, as it will be seen, that I touched upon the subject of fetters, housing, water, food allowance, and cooking under shade, and as regards health, and cleanliness I particularly dwelt upon the necessity of attending to the *privies* in the zillah jail, and the erection of *Mutchans*, or platforms, for those prisoners who were in *huts* or *tents*, to sleep on, the necessity of such mutchans, I *forcibly* brought to the notice of the medical board *four* years ago, and stated that I thought it an object of the "*utmost importance.*"

Respecting privies, I would wish here again to repeat that the well pykannahs at the Insane Hospital have answered completely for the last ten years, and those at the Allipore Hospital have answered equally well, and that I would strongly recommend their adoption both at the Allipore and zillah jails, and as I have long ago. and often urged, that, I consider that one of those well pykannahs should be made at each of the suburb guards, where the prisoners are located. I may remark that great care ought to be observed in the formation of the receptacles. Well pykannahs made on a plan somewhat similar to those I have adopted, were formed at the Police Office, in the city, and in the fort, but they were defective, in as much, as apertures were left open and they have proved to be, *as I predicted,* perfect failures.

To return to the subject of food, I have examined the articles brought to the zillah jail by Bunneas, and to the best of my judgement they appear good. There are three kinds of rice, old, new, and a medium kind, sold at different prices. Should the prisoners, 20 of whom are allowed to depute one of their body to purchase for them three pice worth of victuals, choose the cheaper rice, on account of getting a larger quantity,

it is possible that *this* may affect their health, particularly if it is not duly boiled, or if swallowed in a hurried manner, if such be the case, a suggestion in the last paragraph of my letter to the medical board, to have their *victuals cooked for* them, might obviate such cause of sickness.

Indeed if the system of rations be continued, I think their food should be cooked for them, tho' in such case, great and constant attention will be necessary to ensure the good quality of the different articles, as well as their being cooked in a proper manner.

It may not be improper to add, that I consider no additional expense need be incurred in carrying into effect the suggestion I allude to, as from every working party of prisoners, one, or more, could be selected, as in the case of men on board ships, both soldiers and sailors, to be cooks, or Mess Orderlies, for the day; the duties of those persons being to collect the raw food from their associates, if money is served to them, or from the moodies, if rations be continued.

These considerations, and the numerous difficulties belonging to the subject induced me to remark in the early part of the letter, that I gave a preference to the money allowance, only that I considered that the zillah prisoners in the 24-Pergunnahs should be placed on the *same footing as those on the Allipore jail.*

In conclusion. I have in former public letters alluded to the healthy locality of the Allipore jail, its excellent tank of water, and the *general airiness* which prevails throughout the building—but must further observe that its inmates have always *two* meals a day, are able to purchase *better* food than the zillah prisoners, most of them have *fish* and those who choose have *ata*; I think it is fair therefore to conclude that the good state of health they enjoy, depends much upon those *advantages conjointly*, and as the zillah prisoners do not enjoy equally good health, I cannot help attributing the difference to the *want* of *comfort* as regards *food*, and *the participation of the other benefits*, in a *less degree* than their fellow sufferers in confinement at Allipore.

I have, &c.

(Signed) F. P. STRONG,

*Surgeon* 24-*Pergunnahs*.

*Feby.* 28*th* 1838.

*The Courts Report to Government dated 25th May,* 1838.

Nizamut Adawlut.

Present.

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| R. H. Rattray, Wm. Braddon and WJ. H. Halhead . Judges | Para. 2. "The Report by Dr. Strong " on the circumstances by which the health " of Prisoners is affected, appears to the " Court to be deserving of attention." |
| Wm. Money and J. R. Hutchinson Tempy. Judges | |

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*From the Surgeon of the 24-Pergunnahs.*

To R. H. MYTTON, Esquire.

*Magistrate of the 24-Pergunnahs.*

Sir, 1845.

I had the honor to receive your letter of 13th instant with copy annexed of the letter from Mr. Under Secretary Turnbull, dated 26th September, 1844, requesting me to furnish you with my opinion relative to the new system of allowing to prisoners *two* cooked meals per diem at the earliest date I could conveniently submit it.

A *year* having elasped, I proceed, conformably to your last letter to make my report for the whole of the year 1844, upon the working of the present dieting system ; and as I consider the most efficacious way is to compare it with former systems for the same purpose, I would observe, the last rules abrogated those circulated on the 9th of July 1841, which again superseded those contained in circular orders No. 24 and 28 dated respectively the 26th April, & 23rd Aug. 1839.—And the last mentioned rations succeeded a ration adopted in the Russapugla jail in May 1838, in which year the system of rations, in lieu of money allowance first commenced under the orders of Government. Previous to this latter date, pice were given to each prisoner for his food, and the system that obtained, altogether, was according to the rules for the management of public jails, circulated the 14th of March

The Allipore hospital in this year 1811 was finished, and on the 1st December, same year, my predecessor Dr. Young wrote to Government as follows.

" There is every reason to hope " from the great attention which " is now paid to the cleanli- " ness, and internal economy, " of the prisons that the con- " victs will be generally much " more healthy in future, there " is however no reason to sup- " pose that there will be at any " time fewer in hosp ital than *one* " in *ten* of the *whole* number of " prisoners, there has been fre- " quently during the year more " than *twice* that proportion " under my care."

1811,* and which rules were printed anew, *unaltered*, about 4 years ago, so that it may be said they formed the system for more than a quarter of a century before the late several changes took place. (As regards food these orders direct, as noted in the Margin.

All the Prisoners liable to hard labor, shall be brought out of the tents, huts, or jail, by sun rise; reasonable time shall be allowed either at that hour, or at noon, as the Magistrates may deem most convenient for the prisoners to take their *meal*. The rest of the day shall be occupied by the prisoners in performance of the prescribed labor, but they shall uniformly be conducted back to the jail, huts, or tents, *soon enough* to allow of their taking their *evening meal*, and of being mustered, searched, and properly secured before it is dark.

These rules, according to my understanding, direct clearly two regular meals per diem; the morning meal at such period as the magistrate may direct; and as I had, in 1840, for twenty years most strongly, and repeatedly, advocated as *essentially necessary* for men who labour like prisoners, *two* meals per diem, I obtained a copy of the rules with the consent of the Deputy Governor, and transmitted them on the 23rd March 1840, together with a circular of the Medical Board pointing out the necessity of two cooked meals, daily, to the Sudder Nizamut Adawlut; (with which Court I then communicated monthly, according to regulation (14) of 1816. The jail by that regulation being placed immediately under the Superintendence of the Judges of that Court. And I received an official answer from the Register, on the 19th of April, saying the Court were confident the magistrate would pay every attention to the suggestions of the Medical Board for preserving the health of prisoners, and copies of the correspondence were forwarded by the Court to Government. Previous to this, in 1835 indeed, I had already obtained the consents of the Court to make separate returns of the life and zillah prisoners, and in April 1836, in reply to a circular from the prison discipline committee, I pointed out the great difference of position, and health, of these two classes of delinquents. In May 1837 in answer to a circular from Mr. Commissioner Pigou, I again entered at large upon the same subject, and the letter written by me on this occasion was forwarded to the Sudder Court by that Gentleman.

* Ten years after this date, on the 3rd of August 1821, the Sudder Nizamut Adaulut remark with satisfaction upon, "the "small proportion of sick, and "casualties, to the number of "prisoners confined."—The following twenty years exhibited a proportion of *one* sick to *twenty-one* of the *life* and *zillah* prisoners.

Now, as regards the zillah temporary prisoners working on the roads, during all the time I have been, since 1820, in Medical Charge of this *Sudder Station,* I have always advocated that each man should be allowed, under the former pice system, 4, instead of 3 pice per diem, (the allowance obtained by the *life* prisoners at Allipore, who formerly were always much more healthy than the zillah prisoners, averaging *until lately,* about 5 per cent per annum). I have proved in my letter, dated 10th November 1841, accompained by tables, and appendages relating to the price of different kinds of food throughout our Indian Provinces, to the satisfaction I believe of the Sudder Nizamut Adawlut, and the Medical Board, that articles of food have always been, at this presidency, much dearer than elsewhere, and it was ever obvious to me that for 3 pice, the men could not here obtain the necessary quantity of *animal* food even for one meal, exposed as they were, with only *one* evening meal, to the malaria of Bengal on an empty stomach, together with a little *raw,* or *parched,* Gram, or Rice, (which the Medical Board object to, under public circulars for the instructions of all Civil Surgeons.) I therefore, after many years observation and consideration, pointed out, on the 28th February, 1838, in a letter to the Sudder Nizamut Adawlut, and in *numerous official* letters since that date, to the Sudder, and Zillah Courts, the great healthiness that obtained among the Allipore *Life* prisoners, as compared with the zillah *temporary* ones.—This was for some time doubted by Government, and did not produce the desired effect until last year.—Mr. Patton, the then Magistrate, in answer to the court remarked, "*I think I may as-" sert without fear of contra-" diction, that there does not " exsist a zillah jail, in which " the convicts partake of dress-" ed victuals twice a day.*—

"The Prison Discipline Com-" mitte remark page 47 in " speaking of the Allipore jail, " nine tenths of the prisoners " in Allipore jail are con-" fined for *life,* every one of " these must sooner or later die " in confinement. *None* of the " convicts on the roads are con-" fined for life: the vast majo-" rity of those therefore ought " to be released many years " before their deaths.—Thus the " average age of life prisoners " must be ever much greater " than the average age of tem-" porary prisoners, and conse-" quently the ratio of deaths " amongst the former must ever " ceteris paribus greatly exceed " the ratio of deaths amongst " the latter, when the contrary " is the case the difference of " healthiness must be excessive" (paragraph 110)

Mr. Patton's letter below quoted, shews the small mortality amongst the Allipore *Life* convicts; among the zillah class it had always up to this period, greatly exceeded the 5¼ per cent per annum

**Extract of report of the magistrate of the 24-Pergunnahs to Secretary to Committee of convict labour dated the 27th September 1836.**

"With reference to the 3rd "para. of your letter I beg "briefly to state that the rate of "mortality in the Allipore jail "within the last ten years has "been 5¾ per cent.

After much communication however, both the Sudder, in January, 1840, and the Governmnet in February of the same year, acknowledged my *view to be correct.* Government directed the subject to be investigated and reported upon; and I am now happy to observe the desiderated change as regards food, has been adopted hroughout Bengal.

My comparative tables of health, during different systems of rations, from the commencement of the ration system 1838, I think clearly shew the great advantage of sufficient *animal* food, a point on which, as I have exhibted, the Home Secretary in England after great research and scrutiny, seems entirely to agree, and the tables for diet, under his orders, do, comparatively speaking, correspond with those now adopted by the Government here.

In 1838, Dr. Smith the superintending surgeon and myself proposed, in consequence of great mortality among the working prisoners, a ration with 4 chittacks of fish, or meat *daily.* It was adopted for 3 months and then the contractors 3 pice ration again was had recourse to.

The Court of Nizamut Adawlut did me the honor to send me answers to certain queries as to food, put to the authorities in the adjacent Districts;—and the answers shewed that the dieting was *very low*, and fish or meat *hardly ever obtained.* The Court, also at my request, and to assist me in my enquiries, forwarded to me the mortality of prisoners working on the grand trunk road. Here the mortality was dreadful; out of 13893 prisoners, 2340 died, besides many who were sent home sick, and died on the road, and in the zillah jails; the first amount above stated equals 16-84, per cent.—On further enquiry I ascertained from public documents, and returns, that in our Bengal Provinces for six years (1833.- -38 inclusive,) the mortality among prisoners had been found to average 8-38, per cent. per annum and at that time I *predicted* that with two proper meals daily, and other care, it might be reduced to nearly *one half* this amount.

The men on the grand trunk road had no doubt many hardships to undergo, but if otherwise taken care of and *two* good cooked meals allowed them, I know no reason why they

**Weight of Fish before and after Cooking**

| Before | cb | After | |
|---|---|---|---|
| Prawn shell fish.... | 4 | less | 2½ |
| Tangrah...... .... | 4 | do. | 2½ |
| Gurroge......... .. | 4 | do. | 2½ |
| Goyrah ....... .. .. | 4 | do. | 2½ |
| Khulsha..... ...... | 4 | do. | 2¼ |

should have been so unhealthy, or why the mortality of our 40,000 zillah working prisoners should have been so great, if the spirit of the rules of 1811 had been adhered to, and the *two meals therein directed strictly attended to*; during the period of the least mortality among our Russapugla prisoners 4 chittacks of animal food were allowed to each man every other day. The present ration—in every—respect good; gives this quantity also—every other day, and I agree with you in thinking some animal food should also be allowed to the non-working prisoners. On a former occasion I advised they should have *half* what was allowed to the working men. The table of this year, during which time they have have been deprived of fish, or meat, altogether, exhibits a greater mortality among their class than I have known, the deaths having increased exactly nine times more per annum than at any period during the preceeding 4 years and 8 months. The mortality of last year (since these men have been deprived of animal food) is 5.04 per cent per annum: whereas, for the whole of the former period, it was

D. M. Trueman in his late work on food, and its influence on health, and disease says at page 2 while insisting on the necessity of at *least some animal* food to sustain healthy life.—"It "has the effect of encreasing the "quantity of fibrine in the blood, "and favouring the growth of "the muscular system.—He "adds, no doubt a perfectly "natural nutrition of the body "cannot be obtained without it."

I have quoted on several occasions in my communications to the Sudder, and Zillah Courts, other celebrated authors to this effect: and prominently stated that by experiments, I had ascertained the fish usually eaten by the natives, lost by cleaning, dressing, and cooking, nearly half its weight which I have shewn in marginal tables.—I find all the dietaries framed under the orders of the Home Secretary direct the weight of meat to be given without the bone.—Now during the healthy period of 26 months, the non-working prisoners were allowed animal food, and the abstract table shews a mortality of only 8.30 per cent. per annum among these prisoners in the Zillah jail.—While this last year it has proved to be 6. 43, per cent. among the *above* classes,—and among *all* the Zillah prisoners both of this jail, and the 4 different guards, the latter of whom have had animal food, the mortality is 5. 37.—True it is that

[illegible] 1844 was unhealthy in an unprecedented degree, and I annex a table of the Calcutta mortality shewing the enormous increase of deaths in the first four months, during which period, the mortality was greatest among *all* our prisoners

only 0. 56. per cent per annum.

This appears to bear out Sir James Graham, the Home Secretary, whose opinions I have quoted in my annexed printed tables, as to the necessity of some animal food being allowed, I beg then again to repeat my suggestion, that the non laboring prisoners should be allowed half the quantity allowed to those who labour.

In all other respects except food, the zillah jail prisoners have existed under the same advantages. and disadvantages. Among the former the jail has always been kept clean, with exception to the open ground floor necessaries, in the corner of each ward.—Among the disadvantages, the obnoxious qualities of these nuisances have been officially pointed out by the superintending surgeons, as well as myself for *many years*, particularly in their reports on jails for the year 1839 and 1840, and they have always agreed entirely with me as to the *internal want of air* in the wards, and the want of *space* in each compound rendered more objectionable by the great height of the walls. Remedies for the necessaries were suggested ; and as regards the compounds it was advised that the walls should not be so high, and further thrown out,—both on the northern and southern site of this zillah jail, on ground belonging to Government.

With a view to ascertain the consequences of an improved ration upon the frame of the men, I have had several weighed at different periods prior to, and since the obtainment of a more nutricious diet, and the result, was most favorable,

Abstract of numbers in confinement among the entire zillah prisoners as embraced in my monthly sick returns.

| | | | number above the 2nd period |
|---|---|---|---|
| 1st . .... | 15 months | 805 | 40 |
| 2nd. ...... | 26 months | 665 | * |
| 3rd.......... | 15 months | 737 | 72 |
| 4th ... .... | 12 months | 850 | 185 |
| 5th .. .. .. | 12 months | 903 | 235 |

Allow me to refer to my figured Tables of prisoners both in the jail at Russapugla, and those housed at the different guards ; as well as to another Table applying *exclusively* to the Russapugla jail: they detail the average rates of inmates at the several

Abstract of numbers of all description of zillah prisoners confined in the Russa. Jail.

| | | | number above the 2nd period |
|---|---|---|---|
| 1st........... | 15 months | 472 | 75 |
| 2nd........... | 26 months | 397 | * 0 |
| 3rd........... | 15 months | 449 | 52 |
| 4th........... | 12 months | 484 | 87 |
| 5th.......... | 12 months | 450 | 63 |

Both the above abstracts shew that much fewer prisoners were in confinement during the 26 healthy months than at any other period since 1838.

periods of the ration charges. *It is possible* that an over-crowded state may in some measure, and at some times have tended in a *certain degree to* increase sickness.

I have the honor to be

SIR,

Yours most obedient Servant,

F. P. STRONG,

*Surgeon of the 24-Pergunnahs.*

# FROM

*The Surgeon of the 24-Pergunnahs.*

To

J. A. F. Hawkins, Esq.

*Register of the Sudder Nizamut Adawlut.*

Calcutta, the 24th August, 1843.

Sir,

1st.—In transmitting you the sick returns of prisoners for the Allipore jail, and the zillah jails, I have the honor to annex a copy of my letter to Mr. Mytton of the 19th instantin which I have taken the liberty of suggesting that it might be of great advantage to ascertain the quantum of sickness, and mortality, among all our Bengal zillah prisoners of the Mahomedan caste, as compared with the sickness and mortality, of the Hindoos.—I think it would not only be valuable in a statistical point of view, but would be a guide to the apportioning of food to the two classes of prisoners.

2nd.—Another use of such an enquiry would be that in jail, (as we know the number of each class and the number of deaths,) we have a certain data to calculate upon, which among the population of our provinces it is not easy to get by the census, or the mortality—I find the idea of Mussulmans suffering more from deprivation of their usual food, is. not confined to myself. It will be seen at page 45, of Dr *Malcolmsons* book that among the Hindoos and Mussulman Troops, sent to Ceylon, 12-5 per cent among the Mussulmans suffered from Beribery 6·27 per cent only among the Hindoos, and in another calulation, 21 per cent. Mussulmans, and 8 per cent Hindoos, attributed by the writer, to the good system of animal food, the former had been used to, which they were prevented from procuring at Ceylon by the dearness of all kinds of food—and the necessary remittences to their families.

3rd.—The subject is of great importance and as I understand your Court are about to decide upon a Table of diet for all the Bengal prisoners, I have taken the liberty of entering thus far upon the subject.—I will only add that the proper apportioning of food for prisoners, has been a subject of great attention at home of late years. Generous

diet for promoting and keeping up health, and strength, to the active and laborious, is strongly advocated by the celebrated Dr. *Macculloch*, generally, but particularly, as resisting the effects of malaria :—and Dr. Pereira, has just published a Treatise on food and diet, in which he gives a tabular exhibition of the dietaries allowed by the poor Laws Commissioners, to paupers, and by the *Home Office to Prisoners;* and some other public Institutions.—In the report of this extensive national association there is a learning towards a system of generous food, yet, Dr Pereira in his critical remarks on this agitated question, states, that he does not consider any of them too high, tho' some of them "may be deficient ;—I have urged the necessity of some encrease in animal food, and beg to state that with a knowledge of all the discussion that has taken place upon this subject before him" Dr. Mathew Truman who is a member of several learned societies, both British and Foreign, so late as August last year, published his work on food, and its influence on health, and Disease.—He insists on the necessity of at least some animal food to sustain healthy life and says at page (2) It has the effect of encreasing the quantity "of fibrine in the blood, and favouring the growth of the muscular system" he adds, "no doubt a perfectly natural nutrition of the body cannot be obtained without it.—Now, although I am ready to admit in common with others who have bestowed great attention upon this subject, that a small proportion of animal food with a proper supply of rice, fresh vegetables, and condiment, is sufficient to keep the body of an active man in health, yet to attain this desirable object, we must not bring down that small proportion too low. The quantity, 2 chittacks of fish, *now* given only twice a week when cleaned, dressed, and cooked, weighs a mere trifle more than one chittack, *including bones*, this may be considered as two ounces, and this given at *such distant periods*, can I fear do but very little to support nutrition, and ward off disease in working men, although it may be sufficient for prisoners who are confined in jail, and who do not work.—I have remarked in some of my communications that the great "healthiness" formerly enjoyed by the life prisoners at Allipore—arose I thought, both from the *airiness* of the prison—and from the opportunity each man enjoyed of chosing from a good bazar the food, and condiment, he considered best for himself, and I observed that in considerations about food for prisoners, we should not lose sight of this latter circumstance. Here I must beg to state that I am by

no means averse to the ration system, I consider it has many advantages—although the food that may be good for some, may not be so *for all*, our constitution, propensities, and functions, vary so much, there is some difference in what may be required by the old, and the young—and the condiment also to which men may have been accustomed, may have a material effect upon their health. Nevertheless, my system of rations that was adopted during 26 months when 4 chittacks of animal food was allowed every other day to each man, answered better than any former plan of pice, or ration, and a healthiness *never before enjoyed* by the labouring prisoners of our zillah was produced. It appears a part of my duty to enter upon all these particulars, that I may add with others, my best endeavours to assist your Court in arriving at correct conclusions, for of late, the system of feeding prisoners has been so often changed, that it requires minute attention to arrive at the truth—however, figures if correct, are not to be contradicted and I wou'd refer to my Tables for three periods of three different rations for information above alluded to.

I have the honor to be

SIR,

Your most obedient Servant,

F. P. STRONG,

*Aug.* 26th, 1843. *Surgeon of the* 24-*Pergunnahs*.

No. 1639.

*7th November*, 1843.

FORWARDED BY MAGISTRATE TO THE SURGEON, 24-PERGUNNAHS.

To

*The Magistrate of 24-Pergunnahs.*

Nizamut Adawlut

Present

C. Tucker Esq } Judge. } SIR, The Court having had before them your letter No. 1066 of the 6th instant, direct me to observe that you must adhere as closely as possible to the rules laid down in the circular order of the 6th ultimo, but that you are at liberty in communication with the Civil Surgeon, to make such trifling alterations as you may think necessary.

As non labouring prisoners are very small in number, and sentenced for short periods, in comparison with prisoners under sentence of labor, change of diet is not so necessary for them. But the diet table will of course be reconsidered on the receipt of the reports regarding its effects on the health of convicts, which the circular calls for at the close of a year.

I have, &c.

(Signed) F. HAWKINS,

*Register.*

(True Copies)

R. H. MYTTON, *Magistrate.*

Fort William, }
The 17th November, 1843. }